Railroad History Course

THE UNIVERSITY OF
SCRANTON
A JESUIT UNIVERSITY

Hosted By:
Steamtown National Historic Site
The University of Scranton

Table of Contents

Railroad History Course

Class No. 1

Early History – to 1865

American Geography – Advantages of the Railroad
The Age of Experimentation
Growth Through the Civil War
Developing the Business of Railroading

I. AGE OF EXPERIMENTATION

1600 -- 1860

- Pre-railroad inland transportation – the need for a better system
- Importing the technology
- Tool of urban mercantilism
- Establishing an American system

II. GILDED AGE

1860 -- 1910

- The Investors
- The Speculators
- The Consolidators
- Tool of nationalism
- Expansion of the system, and the country
- Labor v. Management

III. AGE OF REGULATION

- Ubiquity and pervasive influence
- Case for government control
- Competition
- Suffocation
- Strangulation

IV. AGE OF DEREGULATION

- Collapse of the system
- The Staggers Act
- New technology
- Revitalization

what is a railroad? A fact

Early Railroad History
"Firsts"

2000 BC	Hero of Alexandria designs first steam machine, the *Aeolipile*. used as a childs toy
	Paved roadways with grooves developed in Asia Minor, Greece
c. 1500	Tramways begin to appear in coal and iron mines in Silesia, Germany and Great Britain
1795	First tramway in United States opens, to haul crushed stone to Beacon Hill, Boston
February 13, 1804	First operation of a steam locomotive, Richard Trevithick's *Pen-y-Daren*
August 12, 1812	*Prince Regent* and *Salamanca* first locomotives placed in regular service
1815	First American railroad charter granted to John Stevens (never constructed)
April 23, 1823	The President, Managers and Company of the Delaware & Hudson Canal Company chartered (oldest continuos railroad charter in U.S.)
1825	John Stevens operates first steam locomotive in North America (a model, never intended for commercial use)
September 27, 1825	Stockton & Darlington Railway opens, first operation of a public railroad in the world (*Locomotion* operates first train, but most were drawn by horses)
March 4, 1826	Granite Railroad opens, to haul granite blocks for Bunker Hill Monument. (tramway, not a common carrier railroad). First use of iron rail. Before this, iron plate on top of wooden beams, however the end would bend up due to the weight and often punctured the floor of cars
February 28, 1827	Baltimore & Ohio Railroad chartered, first common carrier railroad to actually begin construction
July 4, 1828	Cornerstone of Baltimore & Ohio laid by John Carroll
August 8, 1829	Horatio Allen operates first full-sized steam locomotive in North America, the *Stourbridge Lion*, at Honesdale, Pa. only ran twice. Because of it's weight, it tore up the tracks as it went.
October 8, 1829	Delaware & Hudson gravity railroad begins operation
May, 1830	Baltimore & Ohio begins operation from Baltimore to Ellicott Mills, horse-drawn trains
August 28, 1830	*Tom Thumb* demonstrates viability of steam power on the Baltimore & Ohio Railroad, first American built locomotive to pull a car full of passengers over a railroad
October, 1830	Rainhill Trials on the Liverpool & Manchester Railway, first person killed by a train, William Huskisson
1830	Liverpool & Manchester Railway opens, first regularly scheduled common carrier operated exclusively by steam power
December 25, 1830	*Best Friend (of Charleston)* operates first scheduled, steam powered train in North America on the South Carolina Canal & Railroad Company (briefly, the longest railway in the world when completed in 1833)
June 17, 1832	*Best Friend of Charleston* destroyed, first locomotive boiler explosion in America
November 23, 1832	*Old Ironsides* begins operation, first locomotive built by Mathias Baldwin, forerunner of 59,000 Baldwin locomotives

Comparison of American Life

Traditional – 1790	Modern – post 1840
Population: 3.9 million, 2/3 live within 50 miles of Atlantic Ocean	17.1 million, ½ live west of Allegheny Mountains
General Merchant that handled all elements of transactions	Increasing specialization of tasks and interests. General Merchant becoming Merchant Banker
Owner also managed business	Separation of ownership and management, creation of management class
Single purpose business or component	Distinct operating units managed by salaried executives
Partnership form of ownership	Rise of stock corporations
Medieval double entry bookkeeping – little need for more	Statistics as a management tool – development of modern accounting
Market forces coordinate economy	Management coordinates economy
Barter system, little cash	Cash, development of credit
Predominance of home/farm manufacture	Shift to factory system (after 1870)
Subsistence farming, manual labor	Staple crops, introduction of mechanization
90% rural, most jobs are farm labor	The same until after the Civil War
Largest agricultural crop: cotton Cultivation began in 1786	Cotton – 64 million dollar/year crop Wheat – 5,000,000+ bushels/year
Domestic coal production: 1,000 tons	1,039,000 tons (anthracite)
Sources of power – human, horse, wind	Steam power coming on line

As long as the process of production and distribution depended on traditional sources of energy – man, animal and wind power, there was little necessity to innovate. Traditional sources simply could not generate enough volume to require better methods.

Chief limiting factor – lack of coal for increased power

Modern Business Development
1845 – 1865

Railroads first to face the problem of trying to manage a large-scale business

- Volume of traffic, demand for dependable, precisely scheduled, all weather transportation
- Geographical separation – need to manage business operations and personnel over long distances
- Larger workforce than any other type of business of the time
- Massive capital demands, investors demanded accountability (canals from 1815-1860: $188 million. Railroads from 1830-1859: $1.1 billion)

1. **Benjamin Latrobe -- Baltimore & Ohio**
   Financial controls and operational precision
   - Systematic collection of data as a management tool
   - Geographical Division concept of operational management

2. **Daniel C. McCallum – New York & Erie Railway** 6 ft wide tracks on stilts
   Accountability At the time, considered the worst RR in U.S.
   - Developed "General Principles" of administration – proper defining of responsibilities and relationships
   - Perfecting the flow of internal information in order to coordinate the widespread activities of the organization
   - Effective appraisal of men and performance of managers
   - Created first organization chart
   - Essential for controlling costs and setting rates

3. **J. Edgar Thompson – Pennsylvania**
   Line and Staff concept of organizational control
   - Refined McCallum's work
   - Separated "support" functions into distinct departments – Legal, Secretary, Purchasing
   - Created "Line and Staff" to clarify relations between departments
   - Line – Departments responsible for functions of the organization
   - Staff – Responsible for setting standards
   - Example: Division Master Mechanic reported to Division Superintendent (line officer) for operational orders and Chief Mechanical Officer (staff) for how he operated his department

The Result Was:

- Invention of nearly all the basic techniques of modern accounting
- Creation of modern, vertically integrated, multi-unit business enterprises
- Modern business practice on railroads nearly 30 years earlier than almost any other business in the United States
- Change from "invisible hand" of market forces controlling economy to "visible hand" of management

The Civil War
1861 - 1865

Based on two fundamental issues that had not heen resolved hy the framers of the constitution – conflict had heen huilding since the beginning of the country

A. States Rights vs. a Strong Central Government

- Several conflicts already; Shays and Whiskey Rebellions
- Tariff fight of 1828
- Nullification issue of 1832

B. Slavery

- Emotional issue, easily understood
- Easy to stir passions
- What the country was willing to go to war over
- But if only issue, could have probably been resolved by 1820
- Any objective analysis would have shown that slavery hurt whites in south and retarded economy far out of proportion to its economic "benefits"
- Coupled to states rights issue, from that point on, no way to settle it separately

A "Civil War" was probably inevitable in order to address tbe first issue – and the country is still addressing it

Known as the first railroad war

- Logistics, most notably demonstrated in the battles for Chattanooga
- RR became a military target, to be protected or destroyed – Andrews Raid
- North had advantage – standard gauge and integrated command structure
- North – 20,000 miles of track. South – 9,000 miles of track
  No standardized track. – some were 3', some were 6' and everything in between

Forced a shift in strategic thinking for the nation – away from Atlantic trade to continent building "Republican" strategy

- Funded debt
- Pacific Rail Act
- Land Grants
- Homestead Act

Capture of supply train at Appomattox led to Lee's surrender

Last Railroad act; carry Lincoln home

STANDARD DISTANCE BETWEEN RAILS 4' 8½"

Railroad History Course

Class No. 2

1865 -- 1900

The Transcontinental Railroad
Westward Expansion
Railroad Sponsored Immigration
Rail Barons: Investors, Speculators and Consolidators

Railroads provided economic unity

Land Grants

Idea dates from the earliest days of the Republic

Motivated by:

- U. S. surrounded by foreign nations -- Canada (England) to the north, France to the west (until Louisiana Purchase) and Spain to the south (Florida and the southwest)
- Once acquired, it was felt that internal improvements were a way to evidence title
- Reasons:
- Facilitate trade and shorten travel time (better roads, canals, etc.)
- Strengthen the Union and provide for national defense
- Increased value for lands retained by the government, resulting in additional revenue from subsequent sales for national purposes

Unlike Europe, direct Federal ownership of internal improvements was impossible at this time due to sectional rivalries

Resistance to direct Federal aid for internal improvements. Land grants to states for distribution developed as an alternative – indirect

Early Railroads were constructed without Federal aid, but some indirect aid was forthcoming

- Mail contracts
- Use of Army personnel as civil engineers
- Grants of rights-of-way

States also changed policies to make internal improvements easier

- Streamlining procedure for creating corporation (from state charter to articles of incorporation)
- Granting Eminent Domain powers to railroads

640 acres = 1 section

Land Grant System as we know it started in 1850 for grant to states of Illinois, Mississippi and Alabama for construction of Illinois Central Railroad

- Idea that private corporation could sell land and use proceeds to finance construction of improvement (harbor, canal, railroad)
- Encourage colonization

Amount of land given was greatly exaggerated by Democrats in very bitter 1884 election fight. "Giving away the country to the rail barons"

- The best estimate is that 131,350,534 acres given away, 8% of RR on or financed by land grants
- 1945 ICC report estimated value of land at $126,000,000. Government received in return over $900,000,000 in free or below regular rate carriage that was part of the deal.

Land that was otherwise worthless, and would not have been settled on.

Transcontinental Railroad

1832	Hartwell Carter proposes rail line from New York to Yerba Buena (San Francisco) – 32 total miles of railroad in the United States at the time
1845	Asa Whitney presents idea to Congress to link Milwaukee to Puget Sound
1850	Public opinion agitates for a pacific railroad – question became not if, but which route.
1853	Army Corps of Topographical Engineers assigned to survey routes 1. Northern Route – St. Paul to Seattle (Northern Pacific) 2. Council Bluffs to San Francisco Route (Actual route chosen) 3. Central Route – Arkansas River to San Francisco 4. Fort Smith Arkansas to Los Angeles Route (Part later used by Sante Fe) 5. Fulton to San Diego Route (Southern Pacific and Texas & Pacific)
1857	Theodore Judah publishes *Practical Plan for Building the Pacific Railroad*
1860	"Crazy" Judah proposes formation of the Central Pacific Railroad of California
1861	The "Big Four" – Charles Crocker, Mark Hopkins, Leland Stanford and Collis P. Huntington – meet with Judah and agree to incorporate the Central Pacific
1862	July 2 – Pacific Railroad Act passed authorizing construction along the Council Bluffs to San Francisco route: "the greatest engineering feat ever attempted" • Established the Union Pacific Railroad to construct the route • Set up bond structure to finance the route -- $16,000, $32,000 and $48,000 differentials depending on terrain (loans that had to be repaid) • Awarded right-of way of 200' on either side of the tracks and gave land grant of 5 alternate sections of land per mile (exempted were lands known to contain minerals) • Both companies had to give priority to government transportation • Only American iron could be used for rails • No grade in excess of 116 feet per mile or curves tighter than 14% were allowed
1863	January 8 – Groundbreaking ceremony for the Central Pacific October 26 – First rails laid by CP November 2 – Judah dies in New York City December 2 – Groundbreaking ceremony for the Union Pacific
1864	July 1 – Amendment to Pacific Railroad Act passed, easier to sell bonds and doubled size of land grant – 12,000 acres/mile March 22 – Credit Mobilier of America formed to construct Union Pacific
1865	First 50 Chinese laborers hired by Central Pacific, 7,000 by the end of the year June 10 – First rails laid by Union Pacific
1866	Union Pacific lays 260 miles of track in 182 days of work Central Pacific assembles largest workforce in America – 10,000 laborers
1867	Cedar Rapids & Missouri River reaches Council Bluffs from the east
1868	Central Pacific averages better than a mile of track laid per day
1869	May 10 – Golden Spike Ceremony at Promontory, Utah

Agricultural History

1790	80% of the population resides on farms, is involved in agriculture
1794	Eli Whitney invents cotton gin
1800	56 man-hours per acre required to grow a wheat crop, 40 hours of that for harvesting
1837	John Deere introduces "steel plow"
1854	Cyrus McCormick introduces first successful horse drawn reaper
1862	$968 required to equip average sized farm
	Homestead Act passed
1868	Patrons of Husbandry formed
1880	Farm population is 21.9 million, 43.8% of the general population
1880	20 man-hours per acre required to grow a wheat crop, 12 hours of that for harvesting
1900	15 man-hours per acre required to grow a wheat crop, 8 hours of that for harvesting
1935	10% of American farmers have access to electrical service, compares to 90% in Japan, 95% in France and 100% in the Netherlands
1970	Farm population is 4.8% of general population

The Gilded Age
&
Rail Barons

Name comes from Mark Twain novel

Typified by a "Boom and Bust" cycle that was a fundamental part of railroad development at this time about 1820

Massive amount of investment of the world's capital in American railroads – 71,212 miles of track constructed from 1880 to 1890 alone. Does not take into account the rest of the system – buildings, rolling stock, replacing iron rail with steel, employees, etc. that also grew accordingly

Poor popular understanding of the needs of capital (dividends). One element in the growing rift between labor and management/owners

Government had not yet developed a culture for controlling large-scale private enterprise and business dealings – endemic political corruption

Political debate surrounding states rights vs. a strong central government now shifts to economic/labor struggle over the same fundamental question

- Managed competition
- Regulated monopoly

Financial Panic of 1873 a defining event for the half-century

Railroads powerful enough by 1876 to effect the national election

Rise of the "Robber Baron". Name comes from journalists and is too simplistic to describe either the men themselves or the times they operated in

Three types or phases

- Investors – Erastus Corning, Commodore Vanderbilt, Moses Taylor - long term
- Speculators – Daniel Drew, Jay Gould, Jim Fisk - make money
- Consolidators – J.P. Morgan, E.H. Harriman

Put RR on firm financial footing, but monopolized

Jay Gould
1836 – 1892

"The Most Hated Man In America"

Born in upstate New York to family of modest means. Early career as clerk, surveyor.

Frail, never in good health.

Tannery

- First large-scale business venture
- Chose Northeastern Pennsylvania because of large tract of hemlock and access via DL&W
- Began in 1856 with New York partners – Gould was working manager
- Tannery location became present community of Gouldsboro
- 1859, Gould bought out 1st partner, got second
- Second partner died, trouble with executors of estate – distrusted Gould
- Executor came to Scranton and got lawyer to help him evict Gould, while Gould was waiting for him in New York
- Gould returned, rallied employees, drove out executor after pitched battle
- Issue went to court and tannery eventually dissolved

"ERIE WAR"

- Got interested in railroads in 1860, General Manager of the Rutland
- Gould and Fisk came into war as associates of Drew (relatively unknown on Wall Street)
- Drew had been involved with (milking dry) Erie since 1854
- Vanderbilt went after Erie to control competition for his New York Central
- Drew saw opportunity – created scam with Erie bonds and stock to take Vanderbilt's money
- Forced to flee to New Jersey when Vanderbilt found out about it
- Drew and Vanderbilt reached agreement, left Gould and Fisk with hulk of Erie

Vision of a Transcontinental Railroad

- Attempted to gain control of all four trunk lines connecting Buffalo and Pittsburgh to Chicago. Forced New York Central and Pennsylvania to buy them instead, thereby extending their systems beyond their "natural" borders
- Gained control of the Union Pacific (1874 – 1884), attempted merger with the Central Pacific
- Attempted to put system together with Lackawanna (responsible for Binghamton – Buffalo extension), Wabash, Missouri Pacific, Texas & Pacific
- Reached agreement with Southern Pacific for traffic to and from El Paso, Texas
- Framework in place by 1881 – Hoboken, NJ to El Paso, TX
- Unable to keep system together

"Accomplishments"

- Gould and Fisk attempted to corner the national gold supply
- Attempted to purchase the Albany & Susquehanna RR – pitched battle at Long Tunnel
- Triggered era of cutthroat rate wars and overbuilding 1875 – 1890
- Accused of swindling Thomas Edison out of the quadreplex – device for controlling telegraph transmissions
- Owned Western Union Telegraph – possible source of "hate" reporting by national press
- Owned Associated Press, and New York World (sold to Joseph Pulitzer)
- Involved in 1876 settlement of national election
- Attended one dinner for candidate Blaine in 1884, cost him the election to Cleveland
- Drove Robert Garrett of the B&O mad – "Don't let Jay Gould steal this state of Maryland before I get back".

Railroads Owned or Controlled During His Career

Chicago & NorthWestern	Delaware, Lackawanna & Western
Rutland	Union Pacific
Missouri Pacific	Wabash
Jersey Central	Texas & Pacific
Missouri, Kansas, Texas	Denver & Rio Grande Western
St. Louis, Iron Mountain & Southern	Denver Pacific
Kansas Pacific	Cotton Belt
Manhattan Elevated	New England & New York
New York & Erie	Utah & Northern

Diagnosed with Tuberculosis in 1888

Died in 1892

Literally worked himself to death

Railroad History Course

Class No. 3

Northeastern Pennsylvania
1800 – 1920

Anthracite, Steel & Railroading
Gravity Railroads
Growth of the Anthracite Railroads
Development of the Lackawanna and Wyoming Valleys

Summit Hill 1781 – 1st coal – 1st gravity R.R.

Lehigh Valley
Central Railroad of New Jersey
Timeline

NOTE:
Regular font is used for Lehigh Valley, *italics* for Central Railroad of New Jersey

1791	*Philip Grinder discovers "stone coal" on Mauch Chunk mountain. **Lehigh Coal Co.** formed and mining begins at Summit Hill*
1803	*First attempt to float stone coal down the Lehigh river in arks – 2 of 6 boats reach Philadelphia but find no market*
	Easton
1813	*Erskine Hazard purchases stone coal for Fairmont Nail & Iron works – creates demand for product*
1817	*Hazard, Josiah White and George Hauto lease Lehigh Coal Co.*
March 20, 1818	*Pennsylvania legislature authorizes improvements to Lehigh river*
April, 1820	***Lehigh Coal & Navigation Company** formed – regular coal shipments to Philadelphia begin shortly afterwards*
December 31, 1824	**Morris Canal & Banking Co.** chartered
January, 1827	*Work begins on gravity railroad from Summit hill mine to Lehigh river*
June, 1829	*Lehigh Canal completed from Mauch Chunk to Easton*
April 7, 1830	**Beaver Meadow Railroad & Coal Company** formed to develop Beaver Meadow mines
November, 1831	Morris Canal completed from Phillipsburg (Easton) to Newark. Reaches Jersey City in 1836
1832	*Pennsylvania completes canal from Easton to Philadelphia*
March 13, 1837	***Lehigh & Susquehanna Railroad** formed to construct railroad/inclined planes from White Haven to Wilkes-Barre*
March 18, 1836	**Hazleton Railroad** incorporated to build 10 miles of track from mine to Weatherly – connection with the Beaver Meadow
November 5, 1836	Beaver Meadow completed from mine to Parrysville on the Lehigh – coal transferred to LC&N canal boats. Flooding later destroys line and transfer is moved back to inclined plane at Penn Haven
1838	*Canal extended from Mauch Chunk to White Haven*
1843	*L&S line opens to Wilkes-Barre*
April 21, 1846	**Delaware, Lehigh, Schuylkill & Susquehanna Railroad Company** formed to build line from Mauch Chunk to Easton

April 1, 1849	*Central **Railroad** of New Jersey formed by merger of **Elizabeth & Somerville Railroad** (chartered February 9, 1831) and **Somerville & Easton Railroad** (chartered February 26, 1831)*
March 10, 1851	Construction begins on DLS&S
October 8, 1851	Asa Packer assumes control of DLS&S
May 11, 1852	Robert Sayre appointed Chief Engineer
July 2, 1852	*CRRofNJ completed to Easton, Pa.*
January 7, 1853	Corporate name change to **Lehigh Valley Railroad**
1854	**Belvidere Delaware Railroad** completed – Phillipsburg (Easton) to Philadelphia
September 12, 1855	LV line complete from Mauch Chunk to Easton
1856	North Branch canal extended from Pittston, Pa to New York state line
1857	**Penn Haven & White Haven Railroad** incorporated to construct line between those two points (LV subsidiary)
1864	White Haven reached
March 20, 1865	**North Branch Canal Co.** corporate name change to **Pennsylvania & New York Canal & Railroad Co.** (LV subsidiary) to construct railroad from Wilkes-Barre to Waverly, NY (connection with the Erie RR)
1866	*CRRofNJ extended from Elizabeth to Jersey City, NJ*
March, 1866	Construction begins to extend LV line to Wilkes-Barre
1867	*Lehigh & Susquehanna completes line from White Haven to Easton*
May 29, 1867	PH&WH Line opens to Wilkes-Barre
August 24, 1869	Line completed from Wilkes-Barre to Waverly
1871	*L&S leased to Central Railroad of New Jersey*
January, 1871	Southern Central Railroad opened from Southern Central Junction (near Waverly) to Auburn, NY. Line extended to Fair Haven, NY (Lake Ontario) by December 1
April 1, 1871	LV leases Morris Canal & Banking Co.
April 3, 1872	**Easton & Amboy Railroad** (LV subsidiary) chartered to construct line to New York harbor
January, 1875	First "anthracite combination" formed to control coal prices – D&H, DLW, LV, Reading, CRRofNJ
May 28, 1875	Line opens from Phillipsburg to Perth Amboy
November 13, 1875	LV RR coal holdings consolidated into **Lehigh Valley Coal Co.**

1876	Trackage rights agreement allows LV access to Buffalo – 3rd rail installed
1877	*CRRofNJ declares bankruptcy*
1881	**Lehigh Valley Transportation** Co. established – Great Lakes shipping subsidiary
November, 1888	Mountain cutoff completed
February 11, 1892	LV and CRRofNJ leased to **Philadelphia & Reading Railroad** – beginning of control by Morgan interests
September, 1892	LV opens its own line between Sayre and Buffalo
April 8, 1893	P&R lease terminated
May 8, 1896	"Black Diamond Express" inaugurated
1897	J.P. Morgan assumes direct control of LV – era of reconstruction begins
1901	*Philadelphia & Reading gains control of CRRofNJ through stock ownership – control continues until 1945*
1912	Panama Canal Act outlaws railroad ownership of steamship lines. ICC orders LV to sell Lehigh Valley Transportation Co.
1912	**Lehigh Valley Coal** Co. incorporated to comply with Hepburn Act
July 30, 1916	*Dynamite explosion at Jersey City pier. Blast felt as far away as Connecticut*
March 26, 1917	Supreme Court upholds ICC order in Lehigh Valley Transportation Co.
November 8, 1923	Supreme Court orders separation of Lehigh Valley Coal Co. from LV
April, 1928	Pennsylvania gains control of LV through stock ownership
June 2, 1939	"John Wilkes" inaugurated
April 21, 1946	LV celebrates centennial
September 14, 1951	Last LV steam operations
April 11, 1962	Pennsylvania assumes direct control of LV
1965	LV and CRRofNJ agree to consolidate operations
March 22, 1967	*CRRof NJ declares bankruptcy*
April 27, 1967	*Jersey City terminal abandoned – all trains routed to Pennsylvania Station, Newark*
June 24, 1970	LV declares bankruptcy
April 1, 1972	LV assumes operation of all CRRofNJ lines in Pennsylvania
October 1, 1973	Proposed date to cease operations and liquidate corporation
April 1, 1976	Inclusion of LV and CRRofNJ in Conrail

Delaware & Hudson
Timeline

1770	Obadiah and Daniel Gore of Wilkes-Barre conduct the first successful burning of anthracite
1788	Jesse Fell of Wilkes-Barre burns anthracite in nailery, first industrial use
1808	Jesse Fell devises grate to burn anthracite successfully
1814	Maurice and William Wurts paid for supplying uniforms during the War of 1812 in the form of 70,000 acres of land in northeastero Pennsylvania around Barrendale, Pa. (one version)
1815	First coal extracted from land near Providence – lost in transit on Jones Creek. Coal Companies realized need good transport
1817	Wurts Brother begin operations at Carbondale
Fall, 1822	1,000 tons of anthracite coal mined at Carbondale, shipped 100 tons to Philadelphia by raft down the Delaware river
March 13, 1823	**The Lackawaxen Coal Mine & Navigation Company** chartered in Pennsylvania to improve the Lackawaxen River
April 23, 1823	**The President, Managers and Company of the Delaware & Hudson Canal Company** chartered in New York to construct a canal from the Hudson River to the Lackawaxen
January 7, 1825	Demonstration of anthracite coal burning at Tontine Coffee House in New York City – to sell shares of the new company
June, 1825	LCM&N merged into D&H
July 13, 1825	Canal construction begins – within months, 2,500 men and 200 teams of horses at work
April 26, 1826	Pennsylvania legislature authorizes construction of a railroad over the Moosic Mountains between Honesdale and Carbondale
April 4, 1827	Decision made to cross Moosic mountains with a "road of rails" instead of a canal
October 16, 1828	First canal boat trip, Rondout to Honesdale
December 5, 1828	First canal boat loads of coal arrive at Rondout
August 8, 1829	First trip of Stourbridge Lion on completed 6 mile line from Honesdale to Prompton
October 9, 1829	First coal delivered to Honesdale via the gravity railroad – 275 coal waggons of 2½ tons capacity, 130 canal boats. 16 miles of railroad, 25 miles of canal on the Lackawaxen, 25 miles of canal on the Delaware, 59 miles of canal across New Jersey, 94 miles along the Hudson to New York
1842	Gravity railroad completely rebuilt with separate loaded and light tracks – becomes true gravity railroad
1845	Gravity railroad extended 7 miles to White Oak Run (Archbald)
1849	Roebling aqueduct across the Delaware river opens
April 19, 1851	**Albany & Susquehanna Railroad** incorporated
1856	Gravity railroad rebuilt, iron T-rail replaces strap rail
1858	Gravity railroad extended 6 miles – froro Archbald to Valley Jct. (southwest Olyphant)
1858	Roebling's wire cable replaces rope on the inclined planes
1859	Passenger service begins between Carbondale and Providence

1860	Standard railroad constructed 4 miles from Valley Jct. to Providence. "Valley" or "Blakely" Railroad
1862	First Dickson locomotive, "Lackawanna", produced for D&H
1865 – 1870	**Plymouth & Wilkes-Barre Railroad & Bridge Co., Howard Coal & Iron Co.** and **Northern Coal & Iron Co.** acquired to gain access to coal lands, mines and feeder railroads in Lackawanna and Luzerne counties
April 21, 1868	New alignment for gravity railroad east of Carbondale opened – featured "Shepherd's Crook" horseshoe curve
January 12, 1869	Albany & Susquehanna completed
August 10, 1869	"Erie War" – pitched battle at Long Tunnel (different than the Erie War on Wall Street)
October 28, 1870	**Jefferson Railroad** opened between Carbondale and Lanesboro, NY – D&H trackage rights
May, 1871	Lease of **Rensselaer & Saratoga** (Albany to Whitehall, NY)
1872	**New York & Canada Railroad** (Whitehall, NY to Canadian border) incorporated
June 17, 1872	**Lackawanna & Susquehanna Railroad** opened between Lanesboro and Ninevah, NY (Albany & Susquehanna) – through route from Scranton through Albany to Whitehall, NY
November 29, 1875	**New York & Canada** completed – Whitehall to Rouses Point, NY (Canadian border)
January 3, 1899	Last train over gravity railroad. Canal sold, all operations cease on June 13
April 1899	Corporate name change to **Delaware & Hudson Co.**
1906	Purchase of **Quebec, Montreal & Southern** – Canadian border to Quebec and Montreal
April 10, 1907	Leonor F. Loree named President
1909	Subsidiary **Hudson Coal Co.** handles all coal sales as a result of Supreme Court decision
March 29, 1915	**Wilkes-Barre Connecting Railroad** opened
April 23, 1923	100th Anniversary
1925	Loree purchases control of Lehigh Valley, Wabash – sold to PRR in 1928
1930	**Delaware & Hudson Railroad Company** set up to take over all D&H Co. properties
July 17, 1953	Last steam operations
1955	Erie sells Jefferson Railroad to D&H (Penn Division)
November 21, 1960	Hudson Coal Co. sold to **Blue Coal Co.** – a subsidiary of **Glen Alden Co.**
April 1, 1976	D&H adds 900 miles of trackage rights and purchase as part of Conrail creation
1981	Penn Division between Carbondale and Stevens Point abandoned in favor of former DLW main line between Scranton and Binghamton
January 5, 1984	**Guilford Transportation Co.** assumes control of D&H
	Delaware, Susquehanna & Western assumes control of D&H
	Canadian Pacific assumes control of D&H
	CP creates subsidiary **St. Lawrence & Atlantic** to manage eastern lines, including D&H

Scranton Iron Industry
Timeline

1777	First attempts to smelt iron with anthracite coal
1838	First successful anthracite iron furnace at Mauch Chunk, Pa.
1838	William Henry investigating iron ore deposits in the Lackawanna Valley
September 4, 1840	William Henry, George Scranton, Seldon Scranton and Sanford Grant purchase "Parsons Lot" from Slocum heirs. **Scrantons, Grant & Company** formed
October, 1840	Work begins on first blast furnace
October 9, 1841	First unsuccessful attempt to smelt ore
January 18, 1842	John Davis conducts first successful operations
May, 1843	Reorganization as **Scrantons & Grant.** Howland & Company and Joseph Scranton become involved. George and Seldon Scranton retain 51.6% controlling interest.
April, 1844	Rolling and puddling mill put into service
July, 1844	Nail factory begins operation – "Lackawanna" brand name
1845	First American "T" rail rolled at Mount Savage Ironworks in Maryland
September 16, 1846	Contract with New York & Erie RR for 4,000 tons of 58 lb. iron rail
October, 1846	Contract with New York & Erie RR for and additional 12,000 tons of rail
November, 1846	Reorganization as **Scrantons & Platt.** Joseph Scranton, John Howland, John I Blair and the following member of the New York & Erie Railroad become stockholders: William E. Dodge, Benjamin Loder and Samuel Marsh. Geroge and Seldon Scranton become minority stockholders
1848	"Scrantonia" post office established – later shortened to Scranton
1848 – 49	Furnaces 2 and 3 placed in operation
1853	Reorganization as **Scranton Iron & Coal Company**
August 15, 1854	**Scranton Coal Company** organized, start of formal involvement by Moses Taylor
1857	George & Seldon Scranton sell their interest in Scranton Coal Co. to William Dodge. Seldon returns to New Jersey
1861	George Scranton dies

1861	LI&C purchases **Mount Hope Iron Company** (located in Rockaway, NJ, obtained to supply iron ore to the Scranton furnaces)
	∠ 17 richest men in the world (27 billion in today's market)
1866	Moses Taylor acquires controlling interest in Scranton Coal Co.
1872	Installation of first coke fueled blast furnace
December 29, 1875	First Bessemer process furnace comes on line. First steel rails rolled
1881	William and Walter Scranton, leave to form **Scranton Steel Company.**
May 4, 1893	First rail rolled by Scranton Steel Company
1891	Scranton Iron & Coal and Scranton Steel Company merged to form **Lackawanna Iron & Steel Company**
1902	Scranton works closed and operations moved to Lackawanna (Buffalo), New York

Delaware, Lackawanna & Western Railroad
Timeline

Morris & Essex Railroad

January 29, 1835	Chartered by the state of New Jersey
January 30, 1836	Construction begins
November 19, 1836	Operations begin between Morristown and Newark, NJ. Track gauge: 4' 10". Strap rail
1842	Strap rail replaced with iron rail
April 1, 1843	First season tickets sold – start of commuter service
January 16, 1854	Extension completed from Morristown to Hackettstown, NJ
November 14, 1862	Extension completed from Newark to Hoboken, NJ
November 15, 1865	Extension completed from Hackettstown to Phillipsburg, NJ (Delaware river)
June 21, 1866	Track is standard gauged
1867	Connection with the Warren Railroad at Washington, NJ. DLW coal moves to Hudson at Hoboken.
December 10, 1868	Leased to **Delaware, Lackawanna & Western Railroad**

Warren Railroad

February 12, 1851	Chartered in the state of New Jersey
June, 1853	Construction begins between Delaware Water gap and New Hampton (junction with the **Central Railroad of New Jersey**)
May 26, 1856	Operations begin
October 1, 1857	Leased to Delaware, Lackawanna & Western Railroad

Delaware, Lackawanna & Western Railroad

1826	**Susquehanna & Delaware Canal & Railroad** chartered by the Commonwealth of Pennsylvania
April 7, 1832	**Ligget's Gap Railroad** chartered by the Commonwealth of Pennsylvania (also spelled Legget)
March 14, 1849	Ligget's Gap Railroad charter purchased by Scranton Company and railroad organized
April 7, 1849	**Delaware & Cobb's Gap Railroad** chartered
May, 1850	Construction begins north from Scranton, Pa. to Great Bend, NY. Track gauge – 6', iron rail
April 14, 1851	Ligget's Gap Railroad corporate name change to **Lackawanna & Western Railroad**
October 16, 1851	Line opened between Scranton and Great Bend – connection with the **New York & Erie Railway**
April 5, 1852	**Lackawanna & Bloomsburg Railroad** chartered to construct line from Scranton to Northumberland, Pa.
March 11, 1853	L&W and D&CG merged to form **Delaware, Lackawanna & Western.** Lackawanna & Western becomes "Northern" division. Delaware & Cobb's Gap becomes "Southern" division.
June, 1853	Construction begins on Southern division between Scranton and Delaware Water Gap

1854	Moses Taylor purchases $25,000 in DLW stock, joins Board of Managers (assumes control)
January 21, 1856	Line completed from Scranton to Delaware Water Gap
June, 1860	L& B opened from Scranton to Northumberland
1864	Samuel Sloan joins Board of Managers (Scranton's are now minor stockholders)
1865(?)	Moses Taylor becomes majority stockholder
1868	Samuel Sloan elected President
March 4, 1869	**Valley Railroad** incorporated to construct line from Great Bend to Binghamton, NY. Opened in 1870
April, 1870	**Utica, Chenango & Susquehanna Valley** and **Green Railroads** leased
June 16, 1873	L&B consolidated into DLW
March 15, 1876	Conversion to standard gauge
August 24, 1880	**New York, Lackawanna & Western Railroad** incorporated to construct line from Binghamton to Buffalo, NY
October 6, 1880	Construction of NYL&W begins
October 2, 1882	NYL&W acquired by DLW
January 17, 1883	Line opens between Binghamton and Buffalo, NY
1884	DLW and Grand Trunk Railroads enter through traffic alliance
March, 1899	William H. Trusdale assumes presidency
1900	Phoebe Snow advertising campaign appears – lasts 17 years with 60+ jingles
1903	First feature length film, "The Great Train Robbery" filmed on DLW
1906	Hepburn Act passed – orders separation of rail and non-rail related (coal) business
1909	**Delaware, Lackawanna & Western Coal Co.** organized to assume coal operations
1909	New Scranton passenger station and general offices opens
February 27, 1907	New Hoboken passenger and ferry terminal opened
December 24, 1911	New Jersey Cutoff opened
June 21, 1915	Supreme Court decision against railroad owned coal companies
November 6, 1915	Nicholson Cutoff (Tunkhannock Viaduct) opened
July 21, 1921	Sale of all DLW coal assets to **Glen Alden Coal Co.**
December 20, 1921	ICC ruled that interlocking directorships are illegal – end of **New York Central** presence
September 3, 1930	Electrified operation of suburban lines begins
1947	DLW begins purchasing **Nickel Plate** stock – announces plans for merger
November 15, 1949	Inaugural trip of "Phoebe Snow"
October 15, 1951	DLW celebrates its 100th anniversary

1954	Talks begin to consolidate operations with **Erie Railroad**
June 16, 1954	Piggyback service begins
1955	Merger proposal with Nickel Plate dies
August 8, 1955	Hurricane Diane wrecks 60 miles of DLW track in the Poconos
1956	Merger talks begin between **DLW, D&H, Erie**
January 28, 1960	DLW assumes control of defunct **Lackawanna & Wyoming Valley**
June 12, 1961	DLW merges with Erie to form **Erie-Lackawanna**

Erie Railroad
Erie Lackawanna Railroad
Timeline

April, 1832	**New York & Erie Railway** chartered
November 1835	Construction begins, track gauge of 6' chosen
1841	First stretch of track in operation
September 16, 1846	Contract signed with **Scrantons & Grant** for first order of iron rail
1848	Starucca Viaduct completed
April 22, 1851	Erie line opens from Piermont to Dunkirk, New York – 446 miles, longest RR in U.S.
September, 1851	First use of telegraph for railroad operations by Superintendent Charles Minot
November, 1853	Line extended from Piermont to Jersey City, NJ
1859	1st bankruptcy, reorganized as the **Erie Railway**
1867	Erie War on Wall Street – "There will be icicles in Hell when Erie common pays a dividend"
1868	**Atlantic & Great Western Railroad** leased – mainline extended to Cleveland
1869	**Jefferson Railroad** leased, Hawley to Honesdale, extended Carbondale to Susquehanna, NY
1869	All locomotives converted to burn coal
1873	2nd bankruptcy – "The Scarlet Woman of Wall Street"
April 27, 1878	Reorganized as the **New York, Lake Erie & Western**
1880	Mainline converted to standard gauge
1880	Atlantic & Great Western reorganized as **New York, Pennsylvania & Ohio** – standard gauged
1883	Line opened to Chicago in connection with **NYP&O** and **Chicago & Atlantic Railway**
1895	J.P. Morgan assumes control, reorganized as the **Erie Railroad Co.** $238 million in bonded debt
1898	**Delaware, Susquehanna & Western Railroad** purchased, includes **Wilkes-Barre & Eastern**
1900	Frederick Underwood assumes presidency
1901	**Pennsylvania Coal Co.** and **Erie & Wyoming Valley Railroad** purchased
1902	E.H. Harriman assumes control
1922	Van Sweringen brothers begin purchasing Erie stock, assume control by 1925

1937	NYS&W, WB&E enter bankruptcy
1942	First dividends ever, paid on Erie stock, "Icicles Froze in Hell Today" press release sent out
May 14, 1951	Centennial celebration
1953	Last steam operations
1954	Merger talks with **Delaware, Lackawanna & Western** begin
1955	Consolidation of operations with Lackawanna begins
July 14, 1954	First piggyback service inaugurated
1955	Jefferson division sold to **Delaware & Hudson**
September 10, 1956	Public announcement of Erie, DLW, D&H merger talks
October 13, 1956	Passenger operations begin shift to Lackawanna's Hoboken terminal
March 22, 1958	Commuter operations shift to Lackawanna's Hoboken terminal
June 18, 1958	4th bankruptcy – "Weary Erie"
August 31, 1958	Joint operations begin between Binghamton and Gibson, NY (Southern Tier)
April 3, 1959	D&H withdraws from merger talks
June 12, 1961	Merger of Erie and DLW to form Erie-Lackawanna (hyphen removed in 1963). "It amounts to a man in a leaky boat lending a hand to a swimmer in shark infested waters." "Erie-Lack-of-Money"
October 12, 1961	Agreement to be considered for inclusion in **Norfolk & Western – Nickel Plate** merger
October 24, 1961	N&W begins acquiring EL stock
October 16, 1964	N&W/NKP merger approved by ICC – encourages EL, D&H, **Boston & Maine** inclusion
September 28, 1965	EL files petition for inclusion in N&W system
1965	N&W – **Chesapeake & Ohio** merger announced. DERECO created to mange EL/D&H/B&M inclusion – control without assuming debt
May 4, 1966	Request filed to abandon all New Jersey commuter service
December 22, 1966	ICC "authorizes and directs" EL and D&H inclusion in N&W
April 1, 1968	DERECO assumes control of EL operations. Assumes control of D&H operations on July 1
1971	N&W/C&O merger called off
June 28, 1972	Hurricane Agnes – 200 miles of EL trackage affected
June 16, 1972	5th bankruptcy. N&W withdraws, ending DERECO control
April 1, 1976	Conrail created – end of Erie Lackawanna as a separate corporate entity

Pennsylvania Coal Co. Gravity Railroad
Wilkes-Barre & Eastern
Timeline

August 24, 1838	**Washington Coal Co.** and **Pennsylvania Coal Co.** chartered
1847	Washington Coal Co. begins construction of a gravity railroad from Dunmore to the Lackawaxen river
1848	**Luzerne & Wayne County Railroad** chartered to construct a gravity railroad from the Lackawanna to the Lackawaxen rivers (Pittston to Hawley).
June 22, 1849	Charter of L&WC and Washington Coal Co. transferred to Pennsylvania Coal Co.
June 8, 1850	L&WC begins operation between Port Griffith (Pittston) and Hawley
1860	Pennsylvania Coal Co. receives permission to construct standard railroad from Hawley to Delaware River. Built and operated by **Erie Railroad**
December, 1863	First coal loads shipped by rail from Hawley to Lackawaxen
August, 1874	Passenger service begins on gravity railroad
1882	**Erie & Wyoming Valley Railroad** begins construction of standard gauge railroad from Hawley to Dunmore, Pa. Erie Railroad subsidiary or later absorbed by Erie
December, 1885	E&WV begins operation
December 18, 1885	Last coal load over gravity railroad – replaced by E&WV
March 8, 1892	**Wilkes-Barre & Eastern Railroad** incorporated by the **Delaware, Susquehanna & Western Railroad** to construct a line from Wilkes-Barre to Stroudsburg, Pa.
September, 1892	Riots among black track construction workers for better treatment
September, 1893	WB&E leased to DS&W for 99 years
October, 1893	Wilkes-Barre & Eastern finished
December, 1896	**Susquehanna Connecting Railroad** chartered to connect a railroad from Jenkins Junction (WB&E) to mines in Moosic and Old Forge. Linked to Erie & Wyoming Valley at Moosic Junction
February, 1898	DS&W leased to **Erie Railroad.** Absorbed in 1912
April 1, 1939	Last train operated over WB&E east of Hillside Junction to Stroudsburg. Erie & Wyoming Valley and Susquehanna Connecting Railroad operate remainder of system until Erie abandonment

Pennsylvania Railroad
Timeline

February 26, 1826	Commonwealth authorizes construction of a canal from Harrisburg to Pittsburgh
1826	**Philadelphia, Lancaster & Columbia Rail Road** chartered to construct line from Philadelphia to the Susquehanna river
1827	**Main Line of Public Works** authorized to take over construction of canal/inclined plane from Harrisburg to Pittsburgh
1834	Main Line opens from Philadelphia: PL&C railroad from Philadelphia to Columbia (Susquehanna river), canal to Hollidaysburg, **Allegheny Portage Railroad** to Johnstown, canal to Pittsburgh.
April 13, 1846	**Pennsylvania Railroad** chartered
April 9, 1847	J. Edgar Thompson named Chief Engineer
1847	Construction begins
1848	**Ohio & Pennsylvania Railroad** chartered – Pittsburgh to Crestline, Oh
1850	Line opens from Harrisburg to a connection with the Allegheny Portage Railroad
1851	**Fort Wayne & Chicago Railroad** chartered. Later that year **Pittsburgh, Fort Wayne & Chicago** formed to consolidate O&P and FtW&C.
December 10, 1852	All rail route completed from Philadelphia to Pittsburgh (using PL&C and APR)
February 15, 1855	Mountain division opens between Altoona and Johnstown, bypassing APR
1857	PRR purchases Mainline of Public Works
January 1, 1859	Line open to Chicago via PFtW&C
1861	Lease of **Northern Central Railroad**, access to Baltimore
1866	Juniata shops in Altoona begins constructing steam locomotives
1869	Jay Gould assumes control of PFtW&C

July 1, 1869	PRR leases PFtW&C to thwart Gould control
1874	Line extended to New Jersey, opposite New York
March 7, 1881	**Philadelphia, Washington & Baltimore Railroad** acquired – direct Washington – New York route after 1886.
1900	**Long Island Railroad** becomes PRR subsidiary
1902	"Pennsylvania Special" inaugurated between New York and Chicago. Name changed to "Broadway Limited" in 1912
September 8, 1910	Pennsylvania Station opens – direct service to New York City
1946	PRR declares first financial loss in history
November 1, 1957	PRR and **New York Central Railroad** announce merger talks
1965	Pennsylvania Station in New York City torn down
April 27, 1966	ICC approves PRR – NYC merger
February 1, 1968	Combined operations begin as **Penn Central Railroad**
1969	PC assumes control of **New York, New Haven & Hartford Railroad**
June 1, 1970	Penn Central declares bankruptcy – losing $800,000/day
May 1, 1971	Amtrak operations begin
April 1, 1976	**Conrail** formed from PRR, New Haven, **Lehigh Valley, Central Railroad of New Jersey, Erie Lackawanna, Reading,**

Timeline
New York, Ontario & Western Railroad

October, 1865	**New York & Oswego** Midland Railroad chartered
1868	Construction begins
July 9, 1873	Line completed from Oswego to Jersey City (via trackage rights from Middletown to Jersey City on the Jersey Midland)
July, 1873	NY&OM declares bankruptcy
November 14, 1879	Road purchased by Conrad N. Jordan
January 21, 1880	Reorganized as **New York, Ontario & Western Railway**
1885	Access to Weehawken over West Shore Line
1886	Rome and Utica branches leased
1890	Scranton branch opened from Cadosia to Scranton, constructed as the Ontario, Carbondale & Scranton
1900	**Port Jervis, Monticello & New York Railroad** acquired
1901	Branch extended to Kingston, New York
1904	New Haven Railroad acquires controlling interest
1910	Scranton division double-tracked
May 19, 1937	NYO&W declares bankruptcy (continues for the remainder of its corporate history)
1948	End of steam operations
September, 1953	End of passenger operations
March 29, 1957	End of operations (track removal begins in August)

Coal and Manufacturing

Lackawanna and Luzerne Counties
In 1880

Industry	Percentage of Value of Product	
	Lackawanna	Luzerne
Coal:	41.8	80.2
Manufacturing:	58.2	19.8
Total Value:	$18,374,429	$22,227,384

Industry	Percentage of Employees	
	Lackawanna	Luzerne
Coal:	76.2	92.2
Manufacturing:	23.8	7.8
Total Number:	18,250	28,973

Population Growth and Comparison

In Northeastern Pennsylvania

Year	Scranton	Wilkes-Barre	Carbondale
1830	------	300	
1840	------		
1850	1,000	2,723	4,945
1860	9,223	4,253	5,575
1870	35,092	10,174	6,393
1880	45,850	23,339	7,714
1890	75,215		
1900	102,026		
1910	129,867		
1920	137,783		
1930	143,433		

The Labor Movement in The Anthracite Region

1828	Working Man's Party formed in Philadelphia – beginning of organized labor
1833	General Trades' Union formed in New York City
1849	First recorded anthracite region strike, the John Bates Union, 21 day work stoppage
1862	First murder assigned to Molly Macguires
1865	Railroad Police Act passed, led to formation of P&R Coal & Iron Police
1868	June – Workingmen's Benevolent Association (WBA) formed, first industry-wide union October 17 – Last Molly Macguire murder of the first phase
1869	Noble and Holy Order of the Knights of Labor formed May 10 – WBA calls first general strike in the anthracite region September 6 –Avondale Disaster, 110 men killed, operated by DL&W
1870	March 3 – Mine Safety Act passed, victory for the labor movement Franklin B. Gowen named President of the Philadelphia & Reading, begins consolidating coal operations in the lower fields under P&R control
1872	Miner's and Laborers' Benevolent Association calls 5 day strike
1873	January – Anthracite producers and railroads meet to fix prices, the nation's first major pool
1874	January 1 to June 29 – "The Long Strike" 6 murders assigned to Molly Macguires in wake of long strike
1877	14 people shot by Coal &Iron Police at Shamokin during "The Great Strike" June 21 – 10 Molly Macguires hanged; 4 at Mauch Chunk, 6 at Pottsville
1879	Terrence Powderly assumes Presidency of Knights of Labor
1883	Brotherhood of Railroad Trainmen formed
1886	American Federation of Labor formed
1888	42 day sympathy strike by Miners' and laborers' Amalgamated Association with the Knights of Labor
1897	September 10 – 19 killed and 32 wounded in Lattimer Massacre in Luzerne County, Pa.
1900	September 12 to October 29 – United Mine Workers of America strikes anthracite region
1902	May 12 to October 23 – 165 day UMW anthracite strike
1905	International Workers of the World (IWW) formed
1914	21 strikers killed in Ludlow Massacre, Ludlow Colorado
1922	April 1 to September 11 – 163 day strike, President Harding threatens to send in military to operate mines
1925	September 1 to February 18. 1926 – 170 day strike by UMW, longest conducted by them

Railroad History Course

Class No. 4

Influence on America

The Labor Movement
The Romance of Railroad Travel
Handling the Freight
The Second Industrial Revolution

4-27-99

Railroad Labor History
Timeline

DL&W promoted work at Moses Taylor Hospital (Hospital Cars) — fire dept hired by RR to promote community

1828	Working Man's Party formed in Philadelphia – beginning of organized labor
1833	General Trades' Union formed in New York City (12% workforce were women)
1863	Brotherhood of Locomotive Engineers formed
1869	Brotherhood of Railway Conductors formed
1869	Noble and Holy Order of the Knights of Labor formed
1873	Brotherhood of Railroad Firemen formed
1877	"The Great Strike" – first national strike
1879	Terrence Powderly assumes Presidency of Knights of Labor
1883	Brotherhood of Railroad Trainmen formed
1886	Knights of Labor Strike against Gould railroads in the Southwest
1886	American Federation of Labor formed
1892	Haymarket Square bombing
1892	Homestead Steel Strike
1893	American Railway Union formed
1894	Pullman Strike
1905	International Workers of the World (IWW) formed
1912	James McNamara kills 21 with bomb thrown into the *Los Angles Times* building
1912	Textile workers strike at Lawrence, Mass.
1915	Railroaders force passage of Adamson Act mandating the 8 hour day for all workers by threatening a national strike
1922	Railway Shopmen's strike
1923	B&O Plan proposed to involve labor in planning and management issues – model for the future
1946	President Truman takes over nation's railroads in response to threat strike
May 23, 1946	Railroad unions call national strike, the first since 1894
May 25, 1946	President Truman requests authority to draft railroaders into the military to end strike, settlement reached half way through speech to Congress

Great Strike of 1877

Country had never fully recovered from the financial panic of 73

- Triggered by failure of Jay Cooke company trying to market NP bonds
- May have been worse than the great depression, except there were more farmers and they could at least feed themselves
- 1876 horrible for RRs, many in receivership, rate wars reduced profits and less to carry

Railroads came together in early 1877 to try to come up with solutions

- Rate pool proposed, to help boost revenue
- Wage cuts thrown in almost as an afterthought
- Cuts announced to take effect on June 1 on PRR – at the same time dividends were being paid. key issue - no dividends, no explanation
- Increased bitterness over already low wages, but dividends not cut, men did not understand
- Some tried to negotiate, real difference in philosophy – "Strike is a wicked violation of natural law"
- B&O cut, 2nd in nine months. July 17 RRers at Martinsburg, WVA struck and quickly spread – other sites, but also to general public
- Violence followed, mostly by non-railroaders
- Worst at Pittsburgh, where PRR yards and shops burned
- Nationwide strike – 2/3 of RRs shut down
- U.S. unprepared for this, both emotionally and physically
    - Hayes – Tilden dispute over presidency – not settled until March of '77. Deal involved end of Reconstruction and President of PRR was power broker
    - Army hadn't been paid in months, talk of doing away with it
    - 10 Molly Mcguires hanged on 7/21/77
- Became the first national strike
- Strike brought on a breakdown of civil authority, Vigilance committees formed in many communities to halt looting

Scranton
During the Great Strike

Conditions in anthracite country were perhaps the worst in the nation

- Still feeling effects of bitter strike in 1875
- New York Times reporter found one miner worked for $28.40 a month, less $9.40 for powder. That left $19.00 to feed wife, four kids and grandfather
- 1876 – Six D&H mines closed entirely, another 12 worked less than half time
- DLW workers took a 10% pay cut in September, 1876 and an additional 15% in March, 1877

lowest in the industry

Conditions in Scranton

- Traditionally, DLW workers some of the lowest paid of the anthracite roads, not very militant about striking
- Walkout at Iron works and DLW came on 24th, miners followed in support. For the first time in history, miners refused to let the pumps be manned to keep the mines from flooding
- Seemed to be handled peacefully and an agreement reached by 31st
- But radical elements, especially miners thought railroaders had caved in, called meeting for August 1st
- Large crowd assembled in South Scranton, no leaders, turned into mob and decided to attack company store – crowd estimated at 1,500 to 2,000
- Mob flooded north on Washington Ave and swept workers out of the DLW and steel mill shops
- Mayor had formed citizen posse to protect property, pitched battle on Washington and Lackawanna Avenues
- William Scranton led posse to rescue.
- Shots fired – Three rioters killed
- State and Federal troops arrived and restored order, miners remained on strike until October

Terence Powderly - Knights of Labor, forerunner

Aftermath

- Country on the brink of anarchy. There was a real national, constitutional crisis as great as civil war
- Communists took no part but poised to take over
- As for strikers, lost battle but many managers alarmed into taking action, some wages restored, conditions improved
- Almost immediately, economy turned around, led by a bumper crop that fall. Relieved pressure and smoothed over crisis
- Other actions taken – YMCAs created, company funded insurance
- Legacy of Strike – adversarial relationship that exists to this day
- More strikes, until unions recognized by law and ultimately "won" the war

The Second Industrial Revolution
1896 – 1914

Began with the Financial Panic of 1893

- Broke the boom and bust cycle of 19th century style management – build on a shoestring with undercapitalized finances and then go bankrupt to repudiate debt, then emerge as a financially sound corporation
- RR failures allowed for massive reorganization along sound financial principles, allowed "bankers" to influence management – as receivers
- Transition from entrepreneurs to professional managers appointed by bankers

By 1896, America had the infrastructure – iron/steel manufacturing and solvent railroads – to support the "most gigantic expansion of business in all history"

- U.S. population doubled from 1880 to 1912 – 50 million to 100 million
- Prior to 1883 – 95% of immigrants were from northern Europe and nearly half were women
- After that – 83% from southern and eastern Europe and 3 out of 4 were men – coming for industrial rather than agricultural purposes
- Massive influx stunted union activities and provided a pool of low-paid willing workers
- Number of people living in cities doubled, while those living on farms increased by 1/8th
- 1900 – 38 cities with populations of 100,000 or more, by 1920 – 68 cities
- Corresponding rebuilding of urban infrastructure
  - Birth of the "skyscraper"
  - Subway and streetcar systems
  - Central sewers and water systems

Industry

- Textile and food production doubled by 1914 – more food production in factories and less at home, canned goods, meat and dairy products
- Output of bituminous coal increased four-fold, output of anthracite coal doubled
- Growth of electrical power – by 1914 nearly every town had a power plant, fueled with coal carried by the railroad
- Boost in industrial capacity spawned by availability of electricity for lights, motors, etc. By 1919 40 – 50% of industry was electrified
- Rise of national distribution of consumer goods – mail-order catalogs, rural free delivery, parcel post

The Automobile

- By 1920 – more than 10 million automobiles produced
- Largest growth commodity for the railroads
- Spawned the "good roads" movement – also supported by the railroads – lack of a way to get from the farm to the depot was one of the major irritants of American life
- Also spawned need for oil, another commodity carried by rail

Made Possible by two things: The largest hospitable area on the earth's surface free of artificial political barriers and a rail network that linked even the smallest communities into the most highly interdependent society in the world

Railroads at Their Zenith

By 1910, the American railroad system was the best in the world, unmatched for convenience, comfort, speed, reliability and dependability. Strong competition ensured punctuality. The universality of the Pullman car was especially envied.

- From 1880 to 1910 – railroads consumed 80% of the nation's steel production
- From 1880 to 1916, track mileage grew from 180,000 to 254,000 miles (more than 350,000 including double track, yards, etc.)
- Almost all existing trackage was rebuilt and upgraded – between 1898 and 1906 $4.2 billion was spent upgrading the system and an additional $1.2 billion was spent between 1907 and 1914
- Railroads were the largest consumers of bituminous coal – continued until the switch to diesels
- Between 1896 and 1907, the amount of freight traffic hauled doubled, then doubled again from that figure between 1907 and 1917.
- Real gross national product doubled from 1896 to 1914, placing unprecedented demands on the railroad system.
- Production of "transportation units" and efficiency rose accordingly – by 1914 the railroads were carrying 155% more than in 1898, with only 95% more employees. There was a rise of 30% in productivity from 1890 to 1900, 15% from 1900 to 1910 and a further 15% from 1910 to 1917.

Between 1916 – 1921, railroads reached their zenith

- 97% of all inter-city passenger travel was by train (a percentage never equaled by another transportation mode)
- 100,000 people a night were traveling in Pullman berths (9,000Pullman cars in operation)
- 60,000 meals a day were being served in dining cars
- 1921 – all time high for number of passengers carried by train
- Railroad employment tops 2 million
- By 1916, 15,580 miles of interurban track had been constructed

Total Assets of the Top 5 Industrial Enterprises in 1917

Pennsylvania Railroad	$2.663 Billion
United States Steel Corporation	$2.450 Billion
Southern Pacific Railroad	$1.788 Billion
New York Central Railroad	$1.786 Billion
Union Pacific Railroad	$1.034 Billion

Industrial Enterprises with Assets of more than $500 million

Railroads – 13
All other industries – 1

Emergence of the "Railroad Problem"

1850 to 1900 was a period of prolonged deflation. This was reflected on the railroads. Revenue per ton mile:

- 1870: 1.88 cents
- 1880: 1.22 cents
- 1890: 0.94 cents
- 1900: 0.73 cents

Loss of revenue was offset by massive expansion of railroad system and economy in general and bankruptcy cycle to erase initial capitalization costs

Decline continued until World War I, although the period from 1900 on was one of inflation, inflicted on a world that didn't know what to do about it, or even that understood what was happening.

As costs rose faster than revenues, railroads, became the only industry unable to freely adjust their rates to compete, first because of competition, then because of anti-railroad public sentiment and adverse ICC rulings.

Real wages stayed virtually the same throughout this period, spurring ever greater wage demands from employees whose standard of living continued to slip, even though they were able to force several wage increases.

Railroad History Course

Class No. 5

Decline & Revitalization
1920 – 1999

Regulation and its Effects
Competition and Decline
Postwar Changes and Crisis
Deregulation and Revitalization

Causes of Regulation
1870 -- 1900

Distrust of those in Charge

- Abuse of power and corrupt influence over public officials – evidenced by free passes liberally distributed to politicians – bribes, control of legislatures (Scott Free)
- Stock speculation and financial misdeeds that caused boom and bust cycle
- Belief that stock was "watered" – valued at $17 billion wheo real value was $8 billion – meaning dividends were paid to a wealthy few at the expense of the welfare of the many
- The nation's largest employers, therefore the focus of public outrage and perception of heartlessness in hard times
- Too much power in the hands of too few as "absentee bankers" assumed control of the system after 1893
- Loss of competitive forces with the rise of the "community of interests"

nations largest employer

By 1880, Railroads Were Overbuilt and Undercapitalized

- Many competing routes to the same destinations (20 different routes between Atlanta and St. Louis)
- Not enough traffic to support all of the new trackage
- Fierce competition led to massive rate cuts to attract business
- Rate Pools – an attempt to fix the problem by internal agreement to charge the same rate ("price fixing"). Depended on cooperative goodwill – did not work
- Rebates – charging lower rates to large shippers – Rockefeller (Standard Oil) one of the worst – in one opinioo, Rockefeller did more to bring about regulation of the railroads than the railroads themselves
- Undercutting and breaking the pool agreements resulted in a state of anarchy within the industry
- Good for shippers but railroads unable to meet obligations – revenue to cover operating expenses, bood interest and repayment, stock dividends, capital needs
- Great Strike of 1877 triggered by an attempt at a rate pool – also agreed to wage cuts
- Response shocked railroad managers – *"Universal suffrage (which gives) an air of menace to many of the things civilized men hold most dear"*
- Opened the door to belief that federal intervention (troops to put down strikers) was a good thing
- Railroads wanted regulation to eod rebates and enforce rate pools
- What they eventually got was substantially different

Federal intervention: Railroad felt it would control strikes & unions

What was not clearly understood at the time was that the boom and bust cycle, which the railroads were in large part responsible for, was necessary for the system to survive and continue to grow.

Attempts at Regulation
1869 -- 1900

Early support for government regulation of the railroads came from farmers and small merchants at the State level "farmers union"

- Patrons of Husbandry (The Grange) gave farmers "critical mass" for political clout
- Starting with Illinois in 1869, several Midwest states passed Granger Laws to try to curb abuses
- Wisconsin's Potter Law of 1874 was the most famous of these
- Failed for a number of reasons – bad law in the first place and railroads were strong enough to ignore it Potter law - worst of everything.
- In the 1886 "Wabash Case", the Supreme Court found that state regulation of the railroads violated the interstate commerce clause of the Constitution

By 1886, it was evident that state regulation was not going to work, and also that something had to be done.

Railroads themselves were one of the groups most in favor of regulation, on their terms

- looking for stability
- Hoping to curb rebating – some historians maintain that Rockefeller did more to bring about railroad regulation than the railroads themselves
- Curtail the granting of indiscriminate passes to politicians

The Act To Regulate Commerce of 1887 - but only Congress can make law

- Passed February 4, 1887
- Supported by railroads, independent oil shippers, merchant groups, Grangers
- Created Interstate Commerce Commission
    - Section 1: All rates must be just and reasonable
    - Section 2: Outlawed personal discrimination
    - Section 3: Prohibited undue preference or prejudice
    - Section 4: Prohibits charging higher rates for a shorter haul than a longer haul
    - Section 5: Prohibited pooling agreements
    - Section 6: All rates were to be published and adhered to

Sherman Anti-trust Act passed in 1890

Neither Act had much impact during the 1890s

In the meantime, the financial panic of 1893 had caused many of the weakest railroads to fail, allowing Morgan and other bankers to assume control and bring order to the chaos surrounding rates and overbuilding.

Harriman

The Set up
1900 -- 1910

1900 William McKinley elected to second term. Teddy Roosevelt elected Vice-president

1901 McKinley assassinated, Roosevelt and Progressives come to power

1903 Elkins Act
- Outlawed rebates
- Allowed shippers to challenge rates before the ICC

1906 Hepburn Act
- Allowed ICC to set maximum rates – 30 day notification for changes
- Made ICC orders binding, without court order
- Strengthened anti-rebate provisions
- Effectively freezes rates at 1900 level
- Power to prescribe uniform system of accounting, standardized reports
- Required carriers to divest themselves of ownership of manufacturing and mining concerns, the products of which they carried

1907 Financial panic
- Government asks J.P. Morgan to step in to prevent prolonged crisis
- Railroads overwhelmed by increased traffic just prior to panic, contributory factor and led to a perception that railroaders were poor managers

1910 Mann-Elkins Act
- Gives ICC authority to suspend rates
- Gives ICC authority to change freight classifications – a favorite rebate technique
- Imposed burden of proof on reasonableness of rates on railroads
- Revived short and long haul clause of original ICC act
- Made ICC a legislative, executive and judicial body – extension of Congress

Government regulators adopted attitude that they understand railroading better than management and were somehow more able to solve problems than private management.

Railroads try for an across the board 10% rate increase – managers are made to look foolish and incompetent.

Rates:
The Core of the Problem

Simple definition: The amount charged to move goods, and/or people, from one point to another

- How rates were set was poorly understood, even by the railroads
- Involved thousands, perbaps millions of individual transactions a year, based on thousands of destinations and 10,000+ categories of commodities
- System that emerged – "all that the traffic will bear" – meant to say that market forces and competition dictated rates, but was almost universally misinterpreted as gouging consumers
- Same philosophy led to the most hated rate-making practice of the time period – charging more for short verses long hauls of the same product going to the same destination
- Therefore, it was almost impossible to demonstrate "reasonableness" as required by the ICC

From the railroad perspective

- They were being held hostage by large shippers who demanded rebates
- They needed to set high rates for short hauls in non-competitive areas to offset rate wars that were almost constant in areas were two or more railroads competed
- It was critical to generate enough revenue to pay dividends, in order to attract the massive amounts of additional capital needed to continue the rebuilding of the system required by the second industrial revolution

Also, after 1900 inflation – a phenomenon not understood by anyone at the time – began upsetting traditional understandings of costs and needed to be factored into the rate-making equation. Politicians did not allow this after 1903, no rate increases were allowed until World War I.

By 1910 RR management recognized scope of problem and went before ICC for general rate increase, torn apart during process

- Grandstanding, political futures made, Brandeis took the lead for shippers fighting the railroads
- RR management did not come across well; couldn't answer questions and couldn't understand why politicians couldn't communicate their arguements
- "What the traffic will bear" – misconstrued as arrogance
- RR management of the time considered incompetent partly as a result of this
- Stunned because of what they had done to rebuild system – good management
- Regulators believed railroads were a lot more valuable than RR officials stated, watered the stock to appear poor so they could ask for more money
- Issue settled through a Valuation Study that took about 15 years and proved that railroaders were right

As a result of all these factors, a 1917 study found that, since 1896 railroads had invested $5.6 billion less than necessary for infrastructure since and shippers had paid $8 billion less than they should have for transportation. The railroads have never completely recovered from this capital improvement deficit.

The Knockout Punch
1910 -- 1918

1912 National Election
- William Howard Taft – Republican
- Woodrow Wilson – Democrat
- Theodore Roosevelt – Bull Moose (Progressive)
- Eugene Debs -- Socialist

Panama Canal Act
- Railroads prohibited from owning steamship lines – they might compete

1913 Parcel Post established by United States Post Office
- Shifts revenue away from private express companies that pay railroads for service
- More traffic for railroads, but less revenue (P.O. paid by weight measured every 4 years)
- Revenue loss estimated at $5 million the first year
- Railroads eventually set up Railway Express Agency to handle remainder – high volume, low profit

1914 Clayton Anti-Trust Act
- Prohibited acquisition of one carrier by another

World War I begins in Europe

1915 Recession – 42,000 miles of railroad in bankruptcy

1916 Adamson Act
- Mandated the 8 hour work day for railroad workers
- Increased costs because wages were not reduced accordingly

1917 Wartime traffic begins to overwhelm rail system – RR managers unable to coordinate because of ICC/anti-trust regulations

December 26 -- Executive Order placing the railroads under Federal Control
- United States Railroad Administration created to coordinate system
- Bypassed ICC control
- USRA grants a 28%, then an additional 32% rate increase
- Raises wages to keep railroaders from going to more lucrative wartime jobs

Long-term Consequences
1920 -- 1945

1920 Transportation Act

- Released railroads from Federal control (March 1, 1920)
- Charged ICC with assuring financial health of the railroads
- Power to set maximum and minimum rates
- Railroads allowed to pool traffic
- Consolidation Plan into a limited number of regional systems
- Required ICC permission to build or abandon lines
- Mandated a rate of return of 6%
- Exempted railroads from Clatyon Anti-Trust Act

American railroads became the most heavily regulated business in the world. Regulators believed this was in the public good – regulating a monopoly.

Plan put forward by Glenn E. Plumb to nationalize railroads, supported by railroad unions, shippers, farmers, etc.

All of this came at a time when real competition was emerging that would have broken monopoly in the marketplace – automobiles, trucks and airplanes.

1925 - 1st diesel engine Ingersoll & G.E.

Regulation destroyed flexibility and initiative

- 6% requirement meant railroads now could no longer lower rates without permission either – couldn't respond to competition from trucks, busses, airplanes
- Posted rates (that were public knowledge – no competitive edge) took 10 months to adjust – railroads couldn't respond quickly to market fluctuations
- Railroad management substituted goal of decreasing costs for traditional goal of increased traffic/profit – shift in management culture

Effective result -- government "management' substituted for private control

- Unable to replace "all the traffic will bear" rate setting philosophy with something better
- ICC (government) incapable of long-range planning, responding to competition

"Hobos" not homeless – emerged greatly during great depression (possible derivative - civil war soldiers "homeward bound"

1940 Transportation Act of 1940

- Extended jurisdiction to all modes of transportation (with glaring exceptions)
- Released railroads from charging lower rates for mail/government transportation (land grants provision)

1953 - bankrupt RR could not be liquidated / Diesel engines "Z stripe" part of R&D experiment fluorescent lighting

1939 - Super Chief - Chicago to L.A. 39 hours

The Years of Decline
1945 – 1961

1946	After record earnings and traffic levels during World War II, decline continues • Management attitude that was unable to adapt • ICC policy did not allow railroads to compete with other modes (6% issue) • Indirect subsidies to other transportation modes (highway construction, etc.)
1947	Reed-Bulwinkle Act • Legalized rate bureaus, subject to ICC approval (triumph of regulated monopoly) • Effect was to stifle new technology – intermodal
1954	Interstate Commerce Commission authorizes railroads to carry truck trailers (piggyback service) – several railroads join trucking industry in fighting decision – stunts development for many years
1954	Weeks Committee finds railroads are over-regulated and recommends changes Several railroad presidents warn that, unless changes are made, industry will not survive
1956	Interstate Defense Highway System Act passed
1957	New York Ontario & Western declares bankruptcy – liquidated instead of reorganized, the first major railroad to be so eliminated
	Railroads carry less than one-half of inter-city freight shipments for the first time
1958	Transportation Act of 1958 • Allowed for quicker discontinuance of passenger service on short notice and placed burden of proof on public agencies
	Taxes paid to Washington D.C. by railroads using Union Station exactly equals government subsidy to National Airport
1961	More passengers carried on airplanes than trains for the first time

Crisis and Deregulation
1965 – 1980

February 1968	Penn Central Railroad formed from rivals New York Central and Pennsylvania Railroads • 20,000 miles of track • 94,000 employees • Operates 1/3 of all passenger trains and ½ of all inter-city passenger haulage
June 21, 1970	Penn Central Corporation declares bankruptcy – the largest in U.S. corporate history
May 1, 1971	The National Railroad Passenger Corporation (Amtrak) assumes operation of America's passenger trains
1971	Boston & Maine, Lehigh Valley and Reading file bankruptcy
April 1, 1972	Central Railroad of New Jersey abandons all trackage in Pa.
April 13, 1972	Lehigh & Hudson River files for bankruptcy
June 26, 1972	Erie Lackawanna files for bankruptcy
1973	Penn Central, Reading, and Lehigh & Hudson River announce plans to liquidate
October 16, 1973	Ann Arbor Railroad files bankruptcy
January 23, 1974	Regional Rail Reorganization Act of 1973 (the 3R Act) signed – creates Consolidated Rail Corporation (ConRail) from portions of bankrupt northeast carriers. United States Railway Association created to implement Act
February 5, 1976	Railroad Revitalization and Regulatory Reform Act (the 4R Act) signed
April 1, 1976	Conrail begins operation
October 14, 1980	Staggers Rail Deregulation Act signed

old embargo puts R.R. back in vogue

- remedial - different modes of transport for product

Railroad History Course

Class No. 6

Modern Railroading in Lackawanna County

The National Park Service

The National Park Service and the Railroads
Timeline

diesel locomotive - cost 2.1 million 4500 hp.

1794 Charles Wilson Peale and the birth of the Natural history museum.

1803 Lewis & Clark expedition (Titian Peale's drawings).

1832 George Catlin's first paintings of the American Indian

1840's The writings of Henry David Thoreau, Charles Fennimore Cooper and the birth of the "preservation" idea in the east. The Hudson River School - Cole, Church. Picturing Manifest destiny

Romance of the West
1. The Mountain Man and the search for adventure
2. (Albert) Bierstadt's Mighty Mountains - (1840-1860's)

1849 Establishment of the US Department of the Interior

1864 Yosemite State Park established - first time the government set aside land for the people.

Federal land grant awarded to Northern Pacific RR to help offset/finance cost of construction. Area included summit of Mount St. Helens.

1869 Transcontinental Railroad completed - The RR and the death of the Indian culture & buffalo.

← funded by R.R. entrepreneur Jay Cook

1870 The Langford/Washburn expedition - first scientific exploration and survey of the Yellowstone region. Northern Pacific RR involvement.

1871 Hayden Expedition - Thomas Moran's paintings

1872 Yellowstone Act - first set aside of land as a federal preserve and "pleasuring ground for the benefit and enjoyment of the people."

NP & Yellowstone Promotion
a. 1872 - 1886 - established RR line
b. 1886 onward - built hotels - Old Faithful Inn
c. RR publicity 1893 - yin/yang symbol, *Wonderland* guidebooks. ← progressive RR/nature
d. early 1900's - defense of conservation and protection of YNP.
e. other RR service - 1907, UP; 1915 Chicago, Burlington & Quincy

1890 Yosemite National Park Established
a. Southern Pacific RR - 1890
b. *Sunset* magazine - 1898

promote travel in U.S. - not Europe

1893 Great Northern Railway completed by James A. Hill.

1901 Atchison, Topeka, & Santa Fe RR established service to the Grand Canyon.

1905 El Tover Hotel at Grand Canyon established by AT & Santa Fe.

1907 Yosemite Valley Railroad completed
Del Portal Hotel completed- 4 story luxury - destroyed by fire in 1917.

1908 Grand Canyon National Monument established (18 national monuments)

1909 UPRR arranges with SP for direct sleeping car service from LA to Grand Canyon.

1910 UP institutes Pullman service from San Francisco to Grand Canyon.

1910	Glacier NP established a. Great Northern Railway established line into Glacier NP. b. Glacier Park Hotel - 1913 c. Transcontinental RR observation cars established - 1915
1910 -1916	The RR's help establish the NPS. RR 's main interest in NP/NPS idea was that the parks could help promote tourism/ridership - "dignified exploitation of our national parks".
1911	Debate concerning NPS started in 1908, met stiff opposition
1913	John Muir and the preservation movement losses battle to save Hetch-Hetchy Valley in Yosemite from being dammed for San Francisco water supply. RR's as a group engaged to promote NP's and NPS - park guidebooks, advertising brochures, full-page magazine spreads, underwriting of *National Geographic* special issue.
1914	Stephen Mather appointed Asst. Sect. of Interior for National Parks. Enlists aid of RR; nurtures the alliance between preservationists and western RR officials at every opportunity.
1915	Rocky Mountain NP established. Chicago, Burlington & Quincy Railroad establishes line to park
8/ 25/1916	*Organic Act* signed by President Woodrow Wilson establishes National Park Service.
1919	Zion NP established.
1924	Bryce Canyon NP established. Mather enlists aid of UP to provide support of railroad to canyon and also to North Rim of GC - take charge of tourists throughout region.
1926	Completion of modern highway into Yosemite NP.
1928	UP completes Grand Canyon Lodge. Streamliner *Grand Canyon* introduced by Santa Fe RR on its LA - Salt Lake City main line. *National Parks Special* - UP to Bryce, Zion, GC. *Yellowstone Special* - UP service to West Yellowstone Ridership down by 80% on Yosemite RR due to increased use of automobile. Further reduced during depression.
1944	Yosemite RR line abandoned. Park forced to accommodate cars, spurring the park's modern problems in valley of overcrowding & transportation.
1953	Diesel replaces steam locomotive service on DL & W RR.
1961	Hill family interests in Glacier NP sold.
1970	Merger of NP; GN; CB & Q into Northern Burlington.
1980 5/18	Mt. St. Helens erupts, leveling 250 sq. miles. Northern Pacific owned
1982	Northern Burlington Railroad deeds holdings on Mt. St. Helens to the federal government to facilitate establishment of Mount ST. Helens Volcanic Monument.
1987	Steamtown National Historic Site Established.
1989	Railroad service to South Rim of Grand Canyon re-established by Grand Canyon RR
1990's	Amtrak and NPS implement trains in Alaska with on-board NPS staff. Renewed interest in re-establishing service to other parks, particularly Yosemite and Yellowstone.
1995	Steamtown National Monument dedicates new Museum complex. Ushers in new era of operation, interpretation & education.

THE NATIONAL PARK SERVICE ORGANIC ACT

August 25, 1916

"... The service thus established shall... conserve the scenery and the natural and historic objects and the wild life therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations."

The national parks are the best idea we ever had - Wallace Stegner.

National parks protect physical/tangible natural and cultural resources.

The National Park Service is the custodian of what is real, and most authentic in America.

These real, authentic resources have meanings and convey messages about events and concepts concerning what we as a country consider important about our heritage.

STEAMTOWN NATIONAL HISTORIC SITE
MISSION STATEMENT

The Mission of Steamtown National Historic Site is to further public understanding and appreciation of the development of steam locomotives in the region. Steamtown offers a unique live steam experience and operating railroad facility in a historic railyard.

The significance of Steamtown NHS is that it:

1. Offers visitors a unique live steam experience and operating facility in the historic Delaware, Lackawanna & Western railroad yard.

2. Fosters further understanding and appreciation of the development of steam locomotives in the region as captured in the history of the DL&W.

3. Preserves and protects both the physical/[tangible] resources (structures and artifacts) and the living culture of the steam railroading era.

4. Relates the economic, political, and social impacts in the industrial development and expansion of America.

5. Tells the story of the people who worked in the steam railroad industry.

Steamtown NHS has a place in the National Park System because it:

Addresses a national story and time period (1853-1953) that other National Parks that have railroad related themes do not.

Preserves the history and heritage of the living steam culture.

Allows visitors to experience an integrated railroad system, consisting of:

- The story of the social and technological history of steam railroading.
- An operating railroad.
- The maintenance and restoration operation of the railroad.

WHAT IS INTERPRETATION?

INTERPRETATION - FACILITATES a connection between the meanings of the RESOURCE and the INTERESTS of the VISITOR

- The public must learn to care about the resource before they value the preservation of the resource.
- The primary goal of Interpretation is not to preacb preservation, but to facilitate an attitude of care.
- Preservation depends on the public's access to the meaning of the resource.

Interpretation strives to help the visitor answer two questions - "Why is this place important?" "So what - why should I help to preserve it?"

It helps visitors understand **why** (national) parks are important by making the park's resources **relevant** and by helping the visitor bring their own **meaning** to the site.

Compelling Stories

Focus messages to the visitor on the most essential, most relevant, most **Compelling Stories** the park has to tell, and where these stories fit in a larger scientific, social, or economic context.

Compelling stories will cballenge the audience to re-examine their own values relative to the resources of the park. Universal truths will emerge along with a greater sense of understanding of **why** these resources and stories are important.

"The chief aim of Interpretation is not instruction, but provocation." - Freeman Tilden

A compelling story, wben well told, bas the potential for driving/provoking its listener(s) to a course of action. That same story will have a powerful, irresistible, emotional effect on the listener(s) - something remembered for a lifetime, because the story bas relevance and is told in a compelling manner.

Tangible & Intangible Resources

How do interpreters make stories compelling? By using Tangibles, Intangibles, and Universal Concepts.

- **Tangibles** -- are real objects and resources that bave USES (pbysical features, buildings, artifacts, etc.)
- **Intangibles** -- are resources sucb as past events, people, systems, ideas, values, etc. that bave MEANING.
- **Universal Concepts** -- are intangible resources that almost everyone can relate to and convey FEELING. They might also be described as universal intangibles.

EXAMPLE: A STEAM LOCOMOTIVE

TANGIBLES

steam
smoke box
drive wheels
coal
engineer
boiler on wheels

INTANGIBLES

memories
the romance of travel
"the little engine that could"
fireman
"Casey Jones"
the pride and the passion of construction

Identifying the Universal:

- Universal concepts provide the greatest degree of relevance and meaning to the greatest number of people.
- Not all people will agree on the meaning or share the same perspective towards a universal concept, but all people will relate to the concept in some significant way.
- Universals make meanings accessible and the resource relevant to a widely diverse audience.

The following subjects are of topical interest to most people and can be used to connect tangible objects to relevant and meaningful life experiences:

Conflict between people and cultures
Internal conflicts
Consequences of action Consequences of in-action
Actions of courage Actions of struggle
Actions of faith
Actions of trust
Actions of sacrifice
Actions of hate
Expressions of art, music, and literature
Conflict between people and natural systems
Non-resolution of conflict
Team work Consequences of bad team work
Political struggle
Actions of violence
Commitment to family
Actions of love
Actions of genius
Expressions of craft, skill, competence

Example: The **locomotives** (tangible resource) of Steamtown NHS tell many stories of **bravery**, **danger**, and **romance** (universal concepts).

The ultimate goal of interpretation is a public that:

- Understands that national, state, and local parks and museums are part of their heritage.
- Cares about these places and the resources in them.
- Actively engages in the stewardship, preservation and protection of these tangible and intangible resources.

Railroad History Course

Class No. 7

Steam Locomotive Technology

Interpretive Stations

General Information
About Steam Locomotives

Definition

Locomotive – a mechanical device for converting heat energy into work, through the medium of steam under pressure, for use in railroad applications

Main Components

Boiler – barrel, flues, firebox and outside shell, dome, smokebox
Engine – cylinders, pistons, crosshead, guides, connecting rods, valves and valve gear, wheels
Running Gear – springs, equalizers, front and rear trucks
Appliances – Air pumps, brakes, dynamo, gauges, injectors, feedwater heater, stoker, etc.
Frame
Cab
Tender – "Tank" locomotives do not have a tender, instead, water tank saddles the boiler and a fuel bunker is attached behind the cab

Sources of Heat Energy and Energy Facts

Wood	Anthracite Coal
Bituminous coal	Oil

- Energy is created through external combustion and a steam locomotive is 5 to 8% efficient
- 2,000 pounds of coal has the energy of 5,250 pounds of wood (average)
- Six pounds of water are consumed for every pound of coal burned
- Coal burns at between 1,800 and 2,500 degrees Fahrenheit (the melting point of steel is approximately 2,200 degrees Fahrenheit)
- 1 cubic foot of water equals 1,600 cubic feet of steam, at atmospheric pressure
- Water boils (produces steam) at 212 degrees Fahrenheit at atmospheric pressure
- At 200 psi, water boils at 338 degrees Fahrenheit
- Superheating raises the temperature of steam from approximately 400 to 800 degrees Fahrenheit at 200 psi

Pulling Power

Tractive Effort, rather than horsepower, is the most common method of determining locomotive power: $T = \frac{C \times S \times P}{D}$ where: C = diameter of cylinders in inches, S = stroke in inches P = 80% of boiler pressure, D = driving wheel diameter in Inches

Valve Gear Types

Stephenson Link Motion	Walschaerts	Baker
Southern	Young	

Methods of Locomotive Classification

Construction Number (c/n): Sequential number used by locomotive builder
Whyte System: Generic system based on wheel arrangement
Nickname: Popular name, also based on wheel arrangement
Railroad Class: An alfa-numeric system, different on each railroad, i.e.: class H on the Pennsylvania refereed to 2-8-0s, on the Chicago & Northwestern it referred to 4-8-4s
Road Numbers: The number painted on each locomotive, to identify individual units

Whyte System

Arrangement	Name
0-4-0	
0-6-0	
0-8-0	
0-10-0	
0-10-2	Union
2-2-0	
2-4-0	
2-4-2	Columbia
2-6-0	Mogul
2-6-2	Prairie
2-8-0	Consolidation
2-8-2	Mikado
2-8-4	Berkshire
2-10-0	Decapod
2-10-2	Santa Fe
2-10-4	Texas
4-2-0	
4-4-0	American
4-6-0	Ten Wheeler
4-8-0	Twelve Wheeler
4-10-0	Mastodon
4-12-0	Centipede
4-4-2	Atlantic
4-6-2	Pacific
4-8-2	Mountain
4-10-2	Southern Pacific
4-12-2	Union Pacific
4-4-4	Jubilee
4-6-4	Hudson
4-8-4	Northern
0-6-6-0	
0-8-8-0	
2-6-6-0	
2-6-6-2	
2-6-6-6	Allegheny
2-6-8-0	(Great Northern only)
2-8-8-0	
2-8-8-2	
2-8-8-4	Yellowstone
2-10-10-2	(Santa Fe only)
4-6-6-2	Cab Forward (SP only)
4-6-6-4	Challenger
4-8-8-2	Cab Forward (SP only)
4-8-8-4	Big Boy (UP only)
Non-articulated	
4-4-4-4	(Pennsylvania RR only)
Experimental	
4-6-4-4	Q-1 (Pennsylvania RR only)
4-4-6-4	Q-2 (Pennsylvania RR onlt)
6-8-6	Turbine (Pennsylvania RR only)
2-8-8-8-2	Triplex (Erie, Virginian only)
"Jawn Henry"	Turbine (N&W only)
"Chessie"	Turbine (C&O only)
Geared	
Climax	
Heisler	
Shay	

NOTE: The arrangement, followed by a "T" (i.e. 0-6-0T) indicates a tank locomotive – one without a tender

Railroad History Class
Selected Bibliography and Reading List

1877: Year of Violence
By Robert V. Bruce
Elephant Paperbacks, Ivan R. Dee, Inc., 1169 South Plymouth Court, Chicago, IL 60605
c. 1959 ISBN: 0-929587-05-7

A. Philip Randolph *Messenger for the Masses*
By Lille Patterson
Facts on File Inc., 11 Penn Plaza, New York, NY 10001
c. 1996 ISBN: 0-8160-2827-3

Across America on an Emigrant Train
By Jim Murphy
Clarion Books
c. 1993 ISBN: 0-935-63390-7

Across The Columbia Plain *Railroad Expansion in the Interior Northwest, 1885-1893*
By Peter J. Lwety
Washington State University Press, Pullman WA
c. 1995 ISBN: 0-87422-114-5

Alternative Tracks *The Constitution of American Industrial Order, 1865 – 1917*
By Gerald Berk
Johns Hopkins University Press
c. 1994 ISBN: 0-8018-4656-0

America 1900 *The Turning Point*
By Judy Crichton
Henry Holt and Company
c. 1998 ISBN: 0-8050-5365-4

The American Railroad Freight Car *From the Wood Car Era to the Coming of Steel*
By John H. White, Jr.
Johns Hopkins University Press
c. 1993 ISBN: 0-8018-4404-5

The American Railroad Passenger Car (2 volume set)
By John H. White Jr.
Johns Hopkins University Press
c. 1978 ISBN: 0-8018-2747-7

American Railroads of the Nineteenth Century *A Pictoral History in Victorian Wood Engravings*
By Jim Harter
Texas Tech University Press
c. 1998 ISBN: 0-89672-402-6

The Anthracite Iron Industry of the Lehigh Valley
By Craig L. Bartholomew and Lance E. Metz. Edited by Ann Bartholomew
The Center for Canal History and technology, in cooperation with the Society for Industrial Archeology
c. 1988

Artisans Into Workers *Labor in Nineteenth-Century America*
By Bruce Laurie
University of Illinois Press
C. 1989 ISBN: 0-252-0666-X

The Baldwin Locomotive Works 1831-1915 *A Study in American Industrial Practice*
By John K. Brown
Johns Hopkins University Press
c. 1995 ISBN: 0-8018-5047-9

Basic Steam Locomotive Maintenance
Simmons-Bordman Books Inc.
c. 1980

Beyond Labor's Veil *The Culture of the Knights of Labor*
By Robert E. Weir
Pennsylvania State University Press, University Park, PA 16802-1003
c. 1996 ISBN: 0-271-01499-7

British Investment in American Railways
By Dorothy R. Adler
The University Press of Virginia
c. 1970 ISBN: 8139-0311-4

The Business Career of Moses Taylor *Merchant, Finance Capitalist, and Industrialist*
By Daniel Hodas
New York University Press
c. 1976 ISBN: 0-8147-3374-3

A City's Danger and Defense. Or, Issues and Results of the Strikes of 1877. *Containing the Origins and History of the Scranton City Guard.*
by Samuel C. Logan D.D.
Jason B. Rogers Printing Co., Philadelphia c. 1887

Civil War Railroads
By George B. Abdill
Superior Publishing Company
c. 1961 ISBN: 0-87564-713-8

The Coming of the Civil War
By Avery Craven
University of Chicago Press
c. 1942

Conrail *Volume 1: 1976 – 1982*
By Scott Hartley
Railpace Company, Inc.
c. 1990 ISBN 0-9621541-2-1

The Country Railroad Station in America
By H. Roger Grant and Charles W. Bohi
Center for Western Studies, Augustana College
c. 1988 ISBN: 0-931170-41-9

Crossroads of Commerce: The Pennsylvania Railroad Calendar Art of Griff Teller
By Dan Cupper
Great Eastern Publishing Company
c. 1992

Delaware & Hudson *The History of and Important Railroad Whose Antecedent was a Canal Network to Transport Coal*
By Jim Shaughnessy
Syracuse University Press
c. 1997. Originally published in 1982 by Howell-North Books ISBN: 08156-0455-6

The Delaware, Lackawanna & Western Railroad in the Nineteenth Century 1828 – 1899
The History of the Formation and Development of the D.L.&W. "Family" of Railroads, and their Locomotives, Which in the Following Century Became One of our Most Admired and Beloved Railroads
By Thomas Townsend Taber
Published by Thomas T. Taber III
c. 1977

The Delaware, Lackawanna & Western Railroad in the Twentieth Century, 1899-1960 *Part One*
By Thomas Townsend Taber, Thomas Townsend Taber III
Published by Steamtown Volunteer Association, 150 South Washington Avenue, Scranton, PA 18503
c. 1980

Dining Car Line to the Pacific *An Illustrated History of the NP Railway's "Famously Good" Food, With 150 Authentic Recipes*
By William A. McKenzie
Minnesota Historical Society Press
c. 1990 ISBN: 0-87351-253-7

The Discoverers of America
By Harold Faber
Charles Scribner's Sons, Macmillan Publishing Company, 866 Third Ave., New York, NY 10022
c. 1992 ISBN: 0-684-19217-9

Donner Pass *Southern Pacific's Sierra Crossing*
By John R. Signor
Golden West books
c. 1985 ISBN: 0-87095-094-0

Engines of Change *The American Industrial Revolution 1790-1860*
By Brooke Hindle and Steven Lubar
Smithsonian Institution Press, Washington, D.C.
c. 1986 ISBN: 0-87474-539-x

Enterprise Denied *Origins of the Decline of American Railroads, 1897 – 1917*
By Albro Martin
Columbia University Press c. 1971 ISBN: 0-231-03508-X

Erie Lackawanna *Death of an American Railroad, 1938 – 1992*
By H. Roger Grant
Stanford University Press
c. 1994 ISBN: 0-8047-2357-5

The Fall of the House of Labor *The workplace, the state and American labor activism, 1865-1925*
By David Montgomery
Cambridge University Press, 40 West 20th Street, New York, NY 10011-4211
c. 1987 ISBN: 0-521-37982-2

The Final Years *New York, Ontario & Western Ry*
BY John Krause & Ed Crist
c. 1989 ISBN: 911868-61-5

Floating West *The Erie & Other American Canals*
By Russell Bourne
W. W. Norton & Company
c. 1992 ISBN: 0-393-03044-X

From the Coalfields to the Hudson *A History of the Delaware & Hudson Canal*
By Larry Lowenthal
Purple Mountain Press Ltd.
c. 1997 ISBN: 0-935796-85-1

From Scranton to Cadosia *Along the N.Y.O.&W. Ry. Co.*
By Stephen A. Marder
A Wayne County Bicentennial Project, New visions Digital Publishing
c. 1998 ISBN: 0-9664981-0-0

A Generation of Boomers *The Pattern of Railroad Labor Conflict in 19th Century America*
By Sheldon Stromquist
University of Illinois Press
c. 1987 ISBN 0-252-06344-9

Getting There *The Epic Struggle Between Road and Rail in the American Century*
By Stephen B. Goddard
Basic Books, A Division of HarperCollins *Publishers*
c. 1994 ISBN: 0-465-02639-7

Go Pullman *Life and Times*
By Charles M. Knoll
Rochester Chapter, National Railway Historical Society
c. 1995 ISBN: 0-9605296-3-2

The Great Road *The Building of the Baltimore & Ohio, The Nation's First Railroad, 1828-1853*
By James D. Dilts
Stanford University Press
c. 1993 ISBN: 0-8047-2235-8

The Great Yellow Fleet *A History of American Railroad Refrigerator Cars*
By John H. White
Golden West Books
c. 1986 ISBN: 0-87095-091-6

A History of the American Locomotive *Its Development: 1830-1880*
By John H. White Jr.
Johsn Hopkins University Press
c. 1968 ISBN: 0-846-23818-0

A History of the Lehigh Valley Railrnad *"Route of the Black Diamond"*
By Robert F. Archer
Heimburger House Publishing Company
c. 1977 ISBN: 0-911581-29-4

Industrial Evolution *Organization, Structure, and Growth of the Pennsylvania Iron Industry, 1750 – 1860*
By Paul F. Paskoff
The Johns Hopkins University Press
c. 1983 ISBN: 0-8018-2904-6

The Interstate Commerce Commission and the Railroad Industry
by Richard D. Stone
Praeger Publishers, 1 Madison Avenue, New York, NY 10010
c. 1991 ISBN: 0-275-93941-3

The Lackawanna Story *The First Hundred Years of the Delaware, Lackawanna and Western Railroad*
By Robert J. Casey and W. A. S. Douglas
McGraw-Hill Book Company, Inc.
c. 1951

Laurel Line *An Anthracite Region Railway*
James N.J. Henwood and John G. Muncie
Interurban Press
c. 1986 ISBN: 0-916374-72-6

The Life and Legend of Jay Gould
By Maury Klein
Johns Hopkins University Press
c. 1986 ISBN 0-8018-5771-6

Luzerne County *History of the People and Culture*
An Illustrated history by Dr. Paul J. Zbiek
Strategic Publications
c. 1994 ISBN 0-937537-05-5

Making Sense nf the Molly Maguires
By Kevin Kenny
Oxford University Press
c. 1998 ISBN: 0-19-511631-3

Makin' Tracks *The Story of the Transcontinental Railroad in the Pictures and Words of the Men Who Were There*
By Lynne Rhodes & Kenneth E. Vose
Praeger Publishers
c. 1975 ISBN: 0-275-22020-6

Metropolitan Corridor *Railroads and the American Scene*
By John R. Stilgoe
Yale University Press
c. 1983

The Money Game in Old New York *Daniel Drew and His Times*
By Clifford Browder
The University Press of Kentucky
c. 1986 ISBN: 0-8131-1573-6

The Myth of a Progressive Reform *Railroad Regulation in Wisconsin 1903-1910*
By Stanley P. Crane
The State Historical Society of Wisconsin
c. 1970 ISBN: 87020-110-7

Nature and Culture *American Landscape and Painting 1825—1875*
By Barbara Novak
Oxford University Press
c. 1980, 1995 ISBN: 0-19-510188-X

New York Ceotral and the Trains of the Future
By Geoffrey H. Doughty
TLC Publishing Inc.
c. 1997 ISBN 1-883089-28-x

The North American Railroad *Its Origin, Evolution, and Geography*
By James E. Vance, Jr.
The Johns Hopkins University Press
c. 1995 ISBN: 0-8018-4573-4

North America's Great Railroads
By Thomas York
Barnes & Noble Books. by arrangement with Brompton Books Corporation
c. 1987 ISBN: 0-88029-689-5

The North Carolina Railroad 1849-1871
By Allen W. Trelease
University of North Carolina Press
c. 1991 ISBN: 0-8078-1941-7

Of Pulleys and Ropes and Gear *The Gravity Railroads of the Delaware and Hudson Canal Company and the Pennsylvania Coal Company*
By Philip Ruth
U. S. Department of Transportation, Federal Highway Administration, et. al.
c. 1996

Passage to Union *How the Railroads Transformed American Life, 1829-1929*
By Sarah H. Gordon
Ivan R. Dee Inc., 1332 North Halsted St., Chicago, Ill. 60622
c. 1997 ISBN: 1-56663-138-6

The Pennsylvania Railroad *Its Place in History 1846 – 1996, A Brief History and Research Guide*
Dan Cupper. Editor
Withers Publishing Company
c. 1996 by Philadelphia Chapter, Pennsylvania Railroad Technical & Historical Society

Power At Odds *The 1922 National Railroad Shopmen's Strike*
By Colin J. Davis
University of Illinois Press
c. 1997 ISBN: 0-252-06612-x

The Railroad Cahoose *Its 100 Year History, Legend and Lore*
By William F. Knapke with Freeman Hubbard
Golden West Books
c. 1968

Railroad Land Grants From Canals to Transcontinentals
Natural Resources Law Section, Monograph Series, No. 4
By Thomas E. Root
American Bar Association
c. 1987 ISBN: 0-89707-284-7

Railroad Postcards in the Age of Steam
By H. Roger Grant
University of Iowa Press
c. 1994 ISBN: 0-87745-465-5

Railroad Signatures Across the Pacific Northwest
By Carlos A. Schwantes
University of Washington Press
c. 1993 ISBN: 0-295-97210-6

The Railroad Station: An Architectural History
By Carroll L. V. Meeks
Yale University Press
c. 1956

The Railroad, What It Is, What It Does *The Introduction to Railroading, 4th Edition*
By John H. Armstrong
Simmons-Boardman Books Inc.
c. 1998 ISBN: 0-911382-04-6

Railroads and Regulation 1877-1916
By Gabriel Kolko
W.W. Norton & Company
c. 1965 ISBN: 393-00531-3

Railroad *Trains and Train People in American Culture*
Edited by James Alan McPherson and Miller Williams
Random House
c. 1976 ISBN: 0-394-73237-5

Railroads Triumphant *The Growth, Rejection & Rebirth of a Vital American Force*
By Albro Martin
Oxford University Press
c. 1992 ISBN 0-19-503853-3

The Railway in Town and Country 1830 – 1914
By Jack Simmons
David & Charles Publishers
c. 1986 ISBN: 0-7153-8699-9

The Reading Railroad: History of a Coal Age Empire *Volume 1: The Nineteenth Century*
By James L. Holton
Garrigues House Publishers
c. 1989 ISBN: 0-9620844-1-7

Reading Terminal And Market *Philadelphia's Historic Gateway and Grand Convention Center*
By Carol M. Highsmith and James L. Holton
Chelsea Publishing, Inc.
c. 1994 ISBN: 0-9620877-1-8

Richard Trevithick
By James Hodge
Shire Publications Ltd.
c. 1973 ISBN: 0-85263-177-4

The Road to Disunion *Volume 1, Secessionists at Bay: 1776 – 1854*
By William H. Freehling
Oxford university Press
c. 1990

The Route of Phoebe Snow *A Story of the Delaware, Lackawanna and Western Railroad*
By Sheldon S. King
Railroad Avenue Enterprises
c. 1991

Sand Patch *Clash of Titans, Cumberland to Connellsville and Branches 1837 – 1993*
By Charles S. Roberts
Barnhard, Roberts & Company
c. 1993 ISBN: 0-934118-20-5

Scranton's Historic Furnaces *"A Fine Substantial Piece of Masonry"*
By Daniel K. Perry
c. 1994 by the Commonwealth of Pennsylvania ISBN: 0-89271-060-8

Scenes Along the Rails *Volume 1: The Anthracite Region of Pennsylvania Part 1*
By John W. Hudson, II and Suzanne C. Hudson
Depot Square Publishing
c. 1996 ISBN: 0-9651364-1-8

Scenes Along the Rails *Volume I: The Anthracite Region of Pennsylvania Part 2*
By John W. Hudson, II and Suzanne C. Hudson
Depot Square Publishing
c. 1997 ISBN: 0-9651364-2-6

The Steam Era of Lehigh Valley
By Chuck Yungkurth
Andover Junction Publications
c. 1991 ISBN: 0-944119-07-7

Steam to Diesel *Management Customs and Organizational Capabilities in the Twentieth-Century American Locomotive Industry*
By Albert J. Churella
Princton University Press
c. 1998 ISBN: 0-691-02776-5

Tales of the Rails *An entertaining collection of railroadiana: true tales, railroad lore, stories for young and old*
Edited by Veronica Hutchinson
World Publishing Company
c. 1952

The Texture of Industry *An Archaeological View of the Industrialization of North America*
By Robert B. Gordon and Patrick M. Malone
Oxford University Press
c. 1994 ISBN 0-19-511141-9

To the Columbia Gateway *The Oregon Railway and the Northern Pacific, 1879-1884*
By peter J. Lewty
Washington State University Press, Pullman Washington
c. 1987 ISBN: 0-87422-029-7

Trains of Discovery *Western Railroads and the National Parks*
By Alfred Runte
Roberts Reinhart Publishers
c. 1994 ISBN: 1-879373-68-8

A Treasury of Railroad Folklore *The Stories, Tall Tales, Traditions, Ballads and Songs of the American Railroad Man*
Edited by B. A. Botkin and Alvin F. Harlow
Crown Publishers Inc.
c. 1953

The Twentieth Century Limited, 1938 – 1967
By Richard J. Cook, Sr.
TLC Publishing Company
c. 1993 ISBN: 1-883069-02-6

Union Pacific Country
By Robert G. Athern
Univeristy of Nebraska Press
c. 1971 ISBN: 0-8032-0858-8

Urban Capitalists *Entrepreneurs and City Growth in Pennsylvania's Lackawanna and Lehigh Regions, 1800 – 1920*
By Burton W. Folsom, Jr.
The Johns Hopkins University Press
c. 1981

The Visible Hand *The Managerial Revolution in American Business*
By Alfred D. Chandler. Jr.
Belknap Press of Harvard University Press
c. 1977 ISBN 0-674-94052-0

The Wealth and Poverty of Nations *Why Some Are So Rich and Some So Poor*
By David S. Landes
W.W. Norton & company, 500 Fifth Avenue, New York, NY 10110
c. 1998 ISBN: 0-393-04017-8

Where Rails Meet the Sea *America's Connections Between Ships & Trains*
By Michael Krieger
MetroBooks, Friedman/Fairfax Publishers
c. 1998 ISBN: 1-56799-597-7

The Wilkes-Barre and Eastern Railroad
By Harold S. Fredericks
Railroadians of America
c. 1986 ISBN: 941652-07-6

World Trade Since 1431 *Geography, Technology and Capitalism*
By Peter J Hugill
Johns Hopkins University Press
c. 1993 ISBN: 0-818-5126-2

The World of the Worker *Labor in Twentieth-Century America*
By James R. Green
Hill & Wang
c. 1980 ISBN: 0-8090-0132-2

National Park Service Bibliography

The West of the Imagination
By William H. and William N. Goetzman
W.W. Norton & Company
c. 1986 ISBN: 0-393-02370-2

Trains of Discovery: Western Railroads and the National Parks
By Alfred Runte
Robert Rinehart Publishers
c. 1990 ISBN: 1-879373-68-8

The National Parks: Shaping the System
Division of Publications, National Park Service
c. 1991

The National Park System: The Story Behind the Scenery
Albright, Dickenson and Mott
KC Publications
c. 1987 ISBN: 0-88714-010-6

Periodicals

IA – *The Journal of the Society for Industrial Archeology*

Number 2, 1996 — *Aesthetics of a Modern Industry: Buildings of the Delaware, Lackawanna & Western Railroad's Scranton Yards, 1905 – 1940*
By Amy Slaton

Number 2, 1997 — *"The Continuous Clatter": Practical Field Riveting*
By David S. Simmons

National Railway Bulletin – *The National Railway Historical Society*

Number 4, 1989 — *Railroads on Parade at the World of Tomorrow*
By James E. Kranefeld

Number 5, 1989 — *Landmark Locomotive*
By Frank G. Tamall

The Diesel that Doomed Steam
By James e. Kranefeld

Number 6, 1992 — *The Era of Super Powered Consolidations*
By Bert Pennypacker

Number 1. 1998	*Chicago Railroad Fair* By Robert D. Parmelee

Railroad History *The Railway & Locomotive Historical Society*

158 – Spring, 1988	*The Magic Box: Genesis of the Container* By John H. White Jr.
159 – Autumn, 1988	*Running on Time* By Ian R. Bartky
160 – Spring, 1989	*Early Railroad Empire Builders, 1850 – 1873* By James A. Ward
162 – Spring, 1990	*Replacement Technology: The Diesel as a Case Study* By Maury Klein
163 – Autumn, 1990	*Earnest Elmó Calkins and Phoebe Snow* By Rodney O. Davis
164 – Spring, 1991	*Pennsylvania Railroad Motive Power Strategies, 1920 – 1950* By Michael Bezilla
165 – Autumn, 1991	*"Vultures at the Death of an Elephant": Harry S. Truman, The Great Train Robbery, and the Transportation Act of 1940* By Alonzo L. Hamby
166 – Spring, 1992	*Safety Comes to the Railroads, 1910 – 1939* By Mark Aldrich
167 – Autumn, 1992	*Steam vs. Diesel Locomotives* By Robert Aldag
170 – Spring, 1994	*The Great (Motive) Power Struggle: The Pennsylvania Railroad v. General Motors, 1935 – 1949* By Mark Reuter
173 – Autumn, 1995	*Women Telegraphers in the Railroad Depot* By Thomas C. Jepson

Technology and Culture – *The International Quarterly of the Society for the History of Technology*

July, 1994	*Manufacturing Diversity: Production Systems, Markets, and an American Consumer Society, 1870 – 1930* By Philip Scranton
April, 1995	*From Iron to Steel: The Recasting of the Jones and Laughlin Workforce Between 1885 and 1896* By David Jardini
Supplement to April, 1995	*Determinism and Indeterminacy in the History of Technology* By Philip Scranton